OFD SPECIAL STUDIES

85035--003

Power - Terms of Ref. Initial Docs. Compar. Review 1958-1970

Table 16.3 [10]

# AVERAGE PRICES OF ELECTRICITY TO PRINCIPAL CLASSES OF CONSUMER 1965-70 FOR SEVEN COMPANIES [9]

| | Argentina - SEGBA [17] | | | Mexico - CFE [a],[1] | | | Bogota - EEEB [13] | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1965 | 1968 | 1970 | 1965 | 1968 | 1970 | 1965 | 1968 | 1970 |
| | (in Argentine Pesos) [20] | | | (in Mexican centavos) [21] | | | (in 1968 Col. centavos) [22] | | |
| Residential | 6.37 | 13.38 | 12.50 | 47.4 | 46.9 | 47.0 | 15.3 | 13.4 | 12.4 |
| Commercial | 9.91 | 17.96 | 16.71 | 47.5 | 46.9 | 47.6 | 22.6 | 27.8 | 25.0 |
| Industrial | 5.30 | 9.10 | 7.93 | 20.2 | 21.1 | 20.4 | 19.7 | 21.1 | 19.6 |
| Other | | | | | | | 12.2 | 11.7 | 10.7 |
| Overall | 6.78 | 12.69 | 11.57 | 28.3 | 28.8 | 28.0 | 17.8 | 18.0 | 15.7 |
| incl. taxes | 7.40 | 14.30 | 12.50 | | | | | | |
| Exchange Rate [13] | 1.686 [c] | 3.500 [c] | 3.779 [c] | 12.5 [d] | 12.5 [d] | 12.5 [d] | 15.9 [d] | 15.9 [d] | 15.9 [d] |
| | (in US cents) | | | (in US cents) | | | (in US cents) | | |
| Residential | 3.8 | 3.8 | 3.3 | 3.8 | 3.8 | 3.8 | 1.0 | 0.8 | 0.8 |
| Commercial | 5.9 | 5.1 | 4.4 | 3.8 | 3.8 | 3.8 | 1.4 | 1.7 | 1.6 |
| Industrial | 3.1 | 2.6 | 2.1 | 1.6 | 1.7 | 1.6 | 1.2 | 1.3 | 1.2 |
| Other | | | | 1.2 | 1.2 | 1.3 | 0.8 | 0.7 | 0.7 |
| Overall | 4.0 | 3.6 | 3.1 | 2.3 | 2.3 | 2.2 | 1.1 | 1.1 | 1.0 |
| incl. taxes | 4.4 | 4.1 | 3.3 | | | | | | |
| | (overall ave. = 100) | | | (overall ave. = 100) | | | (overall ave. = 100) | | |
| Residential | 95 | 106 | 106 | 165 | 165 | 173 | 91 | 73 | 80 |
| Commercial | 148 | 142 | 142 | 165 | 165 | 173 | 127 | 155 | 160 |
| Industrial | 78 | 72 | 68 | 70 | 74 | 73 | 109 | 118 | 120 |
| Other | | | | | | | 73 | 64 | 70 |
| Overall | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| incl tax | 110 | 114 | 106 | | | | | | |

| | Cali - EMCali [14] | | | Singapore - PUB [17] [e] | | | Ghana - ECG [b],[19] | | | Malaysia - NEB [24] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1965 | 1968 | 1970 | 1965 | 1968 | 1970 | 1965 | 1968 | 1970 | 1965 | 1968 | 1970 |
| | (in 1968 Col. centavos) [23] | | | (in Singapore cents) [20] | | | (in new pesawa) [15] | | | (in Malaysian cents) [20] | | |
| Residential | 21.5 | 28.0 | 21.1 | 9.68 | 10.61 | 10.60 | 2.7 | 2.5 | 2.5 | 14.53 | 14.13 | 14.18 |
| Commercial | 25.0 | 43.8 | 37.0 | 5.04 | 5.79 | 5.75 | 4.7 | 4.8 | | 11.75 | 10.97 | 10.67 |
| Industrial | 20.8 | 29.7 | 24.3 | 3.54 | 3.53 | 3.30 | 3.0 | 1.9 | | 5.85 | 5.08 | 4.93 |
| Other | 14.8 | 21.9 | 19.2 | 7.50 | 7.50 | 7.50 | — | 6.0 | | 10.80 | 10.48 | 10.98 |
| Overall | 20.5 | 30.9 | 25.4 | 7.09 | 7.00 | 6.71 | 3.4 | 3.0 | 2.8 | 9.12 | 7.97 | 7.74 |
| Exchange Rate [13] | 15.9 [d] | 15.9 [d] | 15.9 [d] | 3.0 [d] | 3.0 [d] | 3.0 [d] | 1.02 [d] | 1.02 [d] | [d] | 3.0 [c] | 3.0 [c] | 3.0 [c] |
| | (in US cents) | | | (in US cents) | | | (in US cents) | | | (in US cents) | | |
| Residential | 1.4 | 1.8 | 1.3 | 3.2 | 3.5 | 3.5 | 2.6 | 2.5 | | 4.8 | 4.7 | 4.7 |
| Commercial | 1.6 | 2.8 | 2.3 | 1.7 | 1.9 | 1.9 | 4.6 | 4.7 | | 3.9 | 3.7 | 3.6 |
| Industrial | 1.3 | 1.9 | 1.5 | 1.2 | 1.2 | 1.1 | 2.9 | 1.9 | | 2.0 | 1.7 | 1.6 |
| Other | 0.9 | 1.4 | 1.2 | 2.5 | 2.5 | 2.5 | — | 5.9 | | 3.6 | 3.5 | 3.7 |
| Overall | 1.3 | 1.9 | 1.6 | 2.4 | 2.3 | 2.2 | 3.3 | 2.9 | | 3.0 | 2.7 | 2.6 |
| incl. taxes | | | | | | | | | | | | |
| | (overall ave. = 100) | | | (overall ave. = 100) | | | (overall ave. = 100) | | | (overall ave. = 100) | | |
| Residential | 108 | 95 | 81 | 133 | 152 | 159 | 79 | 86 | | 160 | 174 | 181 |
| Commercial | 123 | 147 | 144 | 71 | 83 | 86 | 139 | 162 | | 130 | 137 | 138 |
| Industrial | 100 | 100 | 94 | 50 | 52 | 50 | 88 | 66 | | 67 | 63 | 62 |
| Other | 69 | 74 | 75 | 104 | 109 | 114 | — | 203 | | 120 | 130 | 142 |
| Overall | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | 100 | 100 | 100 |
| incl tax | | | | | | | | | | | | |

a) Figures include indirect tax of 10% for all main classes of consumption in 1965; and 10% for residential, small commercial and agriculture, and 15% for large commercial and industrial in 1968 and 1970.

b) Revenue on sales to Valco are 0.26 US cents per kwh, representing 9% of the overall average price for ECG sales.

c) Preliminary estimate

Table 16.6

Average Residential Electricity Bills and Estimated Subsidies by Income Groups in Bogota 1968

(all amounts in 1968 Pesos and on an annual basis; US$ 1.00 = 1968 Ps. 15.90)

| Income Groups | Percent of Families | Social Marginal Cost to supply per family (Ps.) | Ave. Ant. Bill (Ps.) | Subsidy per family (Ps.) | Total Subsidy (Ps. mln) | Ave. Tariff (¢/kWh) | Ave. Cost (¢/kwh) |
|---|---|---|---|---|---|---|---|
| less than 8,000 | 6.7 | n.a. | – | 120 (?) | n.a. | — | n.a. |
| 8,000 – 16,000 | 21.1 | 170 | 38 | 132 | 4.9 | 13.8 | 60.0 |
| 16,000 – 24,000 | 19.4 | 438 | 96 | 342 | 16.4 | 11.0 | 51.0 |
| 24,000 – 32,000 | 17.0 | 576 | 168 | 408 | 13.3 | 11.4 | 40.0 |
| 32,000 – 44,000 | 12.5 | 798 | 336 | 462 | 9.2 | 12.0 | 33.0 |
| 44,000 – 60,000 | 9.4 | 1026 | 408 | 618 | 11.4 | 13.0 | 33.0 |
| 60,000 – 88,000 | 5.9 | 1488 | 612 | 876 | 11.4 | 13.5 | 33.0 |
| 88,000 – 120,000 | 3.6 | 2172 | 912 | 1260 | 10.3 | 13.8 | 33.0 |
| 120,000 – 160,000 | 1.6 | 2580 | 1092 | 1488 | 8.9 | 14.0 | 33.0 |
| 160,000 – 240,000 | 1.3 | 3396 | 1452 | 1944 | 5.0 | 14.1 | 33.0 |
| more than 240,000 | 1.5 | 6066 | 2628 | 3438 | 11.1 | 14.3 | 33.0 |
| Total | 100.0 | | | | (101.9) | 13.4 | |

45-113 EYE-EASE
45-413 20/20 BUFF
NATIONAL Made in U.S.A.

## Table 16.2

## GROWTH AND PATTERN OF ELECTRICITY SALES IN THE REGIONS SERVED BY THE TEN COMPANIES

(in millions of kwh)

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | Percentage Share in 1970 |
| 1 | Argentina – SEGBA | | | | | | | | | | | | | |
| 2 | Residential | n.a. | n.a. | n.a. | n.a. | 1683 | 1777 | 1885 | 1981 | 2122 | 2285 | 2488 | 2707 | 395 |
| 3 | Industrial | | | | | 867 | 1112 | 1291 | 1381 | 1455 | 1636 | 1915 | 2150 | 314 |
| 4 | Commercial | | | | | 388 | 422 | 470 | 503 | 536 | 597 | 670 | 732 | 107 |
| 5 | Public Lighting | | | | | 68 | 75 | | 103 | 118 | 144 | 160 | 194 | 28 |
| 6 | Official | | | | | 134 | 151 | | 187 | 201 | 239 | 253 | 260 | 37 |
| 7 | Public Pumping | | | | | 166 | 190 | 624 | 203 | 206 | 232 | 240 | 247 | 36 |
| 8 | Public Traction | | | | | 179 | 189 | | 136 | 139 | 185 | 211 | 223 | 32 |
| 9 | Bulk | | | | | — | — | | 108 | 98 | 111 | 223 | 348 | 51 |
| 10 | Total | | | | 3094 | 3485 | 3916 | 4270 | 4602 | 4875 | 5429 | 6160 | 6861 | 1000 |
| 11 | Residential % of total | — | — | — | — | 482 | 453 | 441 | 430 | 435 | 420 | 404 | 395 | |
| 12 | | | | | | | | | | | | | | |
| 13 | Brazil – South Central Region | | | | | | | | | | | | | |
| 14 | Residential | n.a. | n.a. | | | 3362 | 3600 | 3861 | 4167 | 4584 | 5129 | 5674 | 6112 | 229 |
| 15 | Industrial | | | | | 7707 | 7865 | 7972 | 9145 | 9291 | 10838 | 12338 | 13584 | 509 |
| 16 | Commercial | | | | | 2307 | 2356 | 2579 | 2722 | 2890 | 3254 | 3616 | 3901 | 147 |
| 17 | Rural | | | | | 242 | 258 | 297 | 307 | 339 | 366 | 192 | 223 | 08 |
| 18 | Public Lighting, Traction, Official | | | | | 2060 | 2055 | 2121 | 2114 | 2411 | 2587 | 2591 | 2858 | 107 |
| 19 | Others | | | | | 314 | 366 | 400 | 146 | 148 | 167 | — | | |
| 20 | Total | | | | | 15992 | 16500 | 17230 | 18601 | 19663 | 22341 | 24411 | 26678 | 1000 |
| 21 | Residential % of total | — | — | — | — | 210 | 218 | 224 | 224 | 233 | 230 | 232 | 229 | |
| 22 | | | | | | | | | | | | | | |
| 23 | Ethiopia – EELPA | | | | | | | | | | | | | |
| 24 | Residential | n.a. | n.a. | | | 35 | 41 | 46 | 52 | 60 | 69 | 73 | 77 | 363 |
| 25 | Industrial/Commercial | | | | | 53 | 65 | 78 | 80 | 99 | 110 | 119 | 131 | 618 |
| 26 | Public Lighting | | | | | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 19 |
| 27 | Total | | | | | 90 | 108 | 126 | 135 | 162 | 182 | 195 | 212 | 1000 |
| 28 | Residential % of total | | | | | 388 | 379 | 365 | 385 | 370 | 379 | 374 | 363 | |
| 29 | | | | | | | | | | | | | | |
| 30 | Ghana – VRA/ECG | | | | | | | | | | | | | |
| 31 | Residential | n.a. | n.a. | n.a. | | | | 102 | 116 | 130 | 140 | 153 | 173 | 63 |
| 32 | Industrial – VALCO | | | | | | | — | 14 | 923 | 1866 | 1972 | 2012 | 735 |

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45-113 EYE-EASE
45-413 20/20 BUFF
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| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | | |
| 1 | Industrial - General | | | | | | | 50 | 57 | 89 | 145 | 182 | 223 | 81 | 1 |
| 2 | Mines (from VRA) | | | | | | | 13 | 127 | 164 | 177 | 186 | 206 | 75 | 2 |
| 3 | Others | | | | | | | 82 | 94 | 98 | 106 | 117 | 126 | 46 | 3 |
| 4 | Total | | | | | | | 247 | 408 | 1404 | 2434 | 2610 | 2740 | 1000 | 4 |
| 5 | | | | | | | | 412 | 284 | 92 | 57 | 59 | 63 | | 5 |
| 6 | Malaysia - NEB | | | | | | | | | | | | | | 6 |
| 7 | Residential | n.a. | n.a. | n.a. | 108 | 120 | 140 | 163 | 184 | 203 | 225 | 249 | 269 | 124 | 7 |
| 8 | Industrial/Mining | | | | 370 | 416 | 465 | 544 | 621 | 697 | 808 | 858 | 926 | 425 | 8 |
| 9 | Commercial | | | | 232 | 267 | 314 | 366 | 423 | 473 | 530 | 577 | 628 | 288 | 9 |
| 10 | Bulk | | | | — | — | — | — | — | — | 205 | 255 | 355 | 163 | 10 |
| 11 | Total | | | | 710 | 803 | 919 | 1073 | 1228 | 1373 | 1768 | 1939 | 2178 | 1000 | 11 |
| 12 | Residential % of total | | | | 152 | 149 | 152 | 151 | 149 | 147 | 127 | 128 | 124 | | 12 |
| 13 | | | | | | | | | | | | | | | 13 |
| 14 | Mexico - national | | | | | | | | | | | | | | 14 |
| 15 | Residential | n.a. | n.a. | n.a. | 1422 | 1612 | 1816 | 1971 | 2256 | 2534 | 2804 | 3152 | 3582 | 165 | 15 |
| 16 | Industrial | | | | 4198 | 4757 | 5566 | 6199 | 6856 | 7755 | 8783 | 10321 | 11795 | 545 | 16 |
| 17 | Commercial | | | | 1428 | 1656 | 1830 | 1992 | 2185 | 2385 | 2592 | 2849 | 3111 | 143 | 17 |
| 18 | Agriculture | | | | 621 | 708 | 809 | 865 | 872 | 930 | 979 | 1199 | 1349 | 62 | 18 |
| 19 | Public Lighting | | | | 275 | 306 | 360 | 436 | 509 | 558 | 624 | 747 | | | 19 |
| 20 | Public Pumping | | | | 391 | 409 | 459 | 514 | 543 | 590 | 652 | 777 | 1846 | 85 | 20 |
| 21 | Others | | | | 273 | 213 | 157 | 164 | 180 | 246 | 271 | 361 | | | 21 |
| 22 | Total | | | | 8608 | 9661 | 10997 | 12141 | 13401 | 14998 | 16705 | 19212 | 21683 | 1000 | 22 |
| 23 | Residential % of total | | | | 165 | 166 | 165 | 162 | 168 | 168 | 167 | 164 | 165 | | 23 |
| 24 | | | | | | | | | | | | | | | 24 |
| 25 | Singapore - PUB | | | | | | | | | | | | | | 25 |
| 26 | Residential | n.a. | n.a. | n.a. | 345 | 382 | 436 | 424 | 471 | 496 | 518 | 567 | 638 | 329 | 26 |
| 27 | Industrial/Commercial | | | | 331 | 334 | 377 | 470 | 583 | 720 | 903 | 1058 | 1273 | 655 | 27 |
| 28 | Public Lighting | | | | 13 | 14 | 15 | 18 | 21 | 23 | 26 | 28 | 31 | 16 | 28 |
| 29 | Total | | | | 689 | 730 | 828 | 912 | 1075 | 1239 | 1447 | 1653 | 1942 | 1000 | 29 |
| 30 | Residential % of total | | | | 500 | 523 | 526 | 464 | 438 | 400 | 357 | 343 | 329 | | 30 |
| 31 | | | | | | | | | | | | | | | 31 |
| 32 | | | | | | | | | | | | | | | 32 |

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45-413 20/20 BUFF
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| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | |
| 1 | Bogota – EEEB | | | | | | | | | | | | | |
| 2 | Residential | 144 | 164 | 175 | 191 | 228 | 262 | 307 | 337 | 386 | 438 | 494 | 566 | 279 |
| 3 | Industrial | 159 | 187 | 194 | 217 | 253 | 300 | 343 | 370 | 397 | 449 | 494 | 570 | 281 |
| 4 | Commercial | 130 | 148 | 148 | 157 | 176 | 200 | 217 | 229 | 238 | 257 | 268 | 293 | 144 |
| 5 | Bulk | 21 | 28 | 24 | 15 | 17 | 23 | 28 | 47 | 66 | 122 | 207 | 344 | 169 |
| 6 | Public Lighting | 19 | 25 | 29 | 32 | 35 | 40 | 42 | 44 | 46 | 56 | 70 | 78 | 38 |
| 7 | Official | 44 | 54 | 55 | 65 | 74 | 84 | 90 | 91 | 119 | 131 | 157 | 182 | 89 |
| 8 | Total | 517 | 606 | 625 | 677 | 783 | 909 | 1027 | 1118 | 1252 | 1453 | 1690 | 2033 | 1000 |
| 9 | Residential % of total | 278 | 270 | 280 | 282 | 291 | 288 | 298 | 301 | 308 | 301 | 292 | 279 | |
| 10 | Medellin – EPM | | | | | | | | | | | | | |
| 11 | Residential | 358 | 405 | 397 | 422 | 491 | 511 | 547 | 576 | 592 | 602 | 625 | n.a. | 500 |
| 12 | Industrial | 157 | 177 | 184 | 212 | 246 | 283 | 300 | 320 | 332 | 347 | 405 | n.a. | 325 |
| 13 | Commercial | 46 | 51 | 53 | 57 | 61 | 64 | 69 | 76 | 81 | 86 | 99 | n.a. | 79 |
| 14 | Bulk | 5 | – | – | – | 3 | 3 | 5 | 5 | 6 | 7 | 8 | n.a. | 06 |
| 15 | Public Lighting | 38 | 40 | 42 | 40 | 38 | 39 | 40 | 41 | 42 | 43 | 39 | n.a. | 31 |
| 16 | Official | 21 | 17 | 26 | 23 | 26 | 27 | 31 | 49 | 48 | 43 | 58 | n.a. | 47 |
| 17 | Others | 15 | 15 | 16 | 18 | 17 | 19 | 19 | 19 | 20 | 19 | 15 | n.a. | 12 |
| 18 | Total | 640 | 705 | 718 | 772 | 882 | 946 | 1011 | 1086 | 1121 | 1147 | 1249 | n.a. | 1000[a] |
| 19 | Residential % of total | 559 | 574 | 552 | 546 | 556 | 540 | 541 | 530 | 528 | 524 | 500 | | |
| 20 | Cali – EMCali | | | | | | | | | | | | | |
| 21 | Residential | 75 | 89 | 101 | 119 | 142 | 160 | 180 | 196 | 210 | 227 | 228 | 255 | 343 |
| 22 | Industrial | 95 | 108 | 116 | 147 | 189 | 202 | 210 | 226 | 251 | 272 | 309 | 349 | 469 |
| 23 | Commercial | 33 | 38 | 47 | 54 | 62 | 67 | 72 | 76 | 78 | 82 | 76 | 79 | 106 |
| 24 | Bulk | 10 | 8 | 14 | 23 | 15 | 6 | 6 | 7 | 7 | 6 | 6 | 8 | 11 |
| 25 | Public Lighting | 5 | 8 | 13 | 18 | 19 | 21 | 21 | 23 | 24 | 26 | 28 | 29 | 39 |
| 26 | Official | 8 | 10 | 11 | 12 | 16 | 18 | 20 | 21 | 23 | 26 | 27 | 24 | 32 |
| 27 | Total | 226 | 261 | 302 | 373 | 443 | 474 | 509 | 549 | 593 | 639 | 674 | 744 | 1000 |
| 28 | Residential % of total | 331 | 340 | 334 | 319 | 320 | 337 | 353 | 357 | 354 | 355 | 338 | 342 | |
| 29 | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | |

Table ~~EP.7~~ 16.1

# TEN POWER COMPANIES – AVERAGE PRICES, COSTS AND PROFITS PER UNIT OF ELECTRICITY AND RATE OF RETURN TO AVERAGE NET FIXED ASSETS, 1955-70

(Prices & Costs in US $ equivalent)

| | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Argentina – SEGBA** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | n.a. | n.a. | n.a. | n.a. | n.a. | 340 | 350 | 360 | 360 | 370 | 440 | 490 | 380 | 410 | 370 | 330 |
| Ave. cost per kwh sold | n.a. | n.a. | n.a. | n.a. | n.a. | 250 | 270 | 250 | 270 | 290 | 300 | 320 | 268 | 230 | 230 | 230 |
| Ave. profit per kwh sold | n.a. | n.a. | n.a. | n.a. | n.a. | 090 | 080 | 110 | 090 | 080 | 140 | 170 | 120 | 180 | 140 | 100 |
| Rate of return on assets (%) | n.a. | n.a. | n.a. | n.a. | n.a. | 162 | 149 | 180 | 119 | 85 | 135 | 158 | 114 | 173 | 146 | 109 |
| **Brazil – Furnas** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | — | — | — | — | — | — | — | — | 055 | 055 | 121 | 139 | 138 | 138 | 129 | 161 |
| Ave. cost per kwh sold | — | — | — | — | — | — | — | — | 019 | 020 | 040 | 044 | 044 | 051 | 053 | 058 |
| Ave. profit per kwh sold | — | — | — | — | — | — | — | — | 036 | 035 | 081 | 095 | 094 | 087 | 076 | 103 |
| Rate of return on assets (%) | — | — | — | — | — | — | — | — | 09 | 59 | 125 | 185 | 170 | 184 | 198 | 187 |
| **Ethiopia – EELPA** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | n.a. | n.a. | n.a. | n.a. | 671 | 576 | 414 | 384 | 388 | 358 | 348 | 359 | 350 | 349 | 368 | 368 |
| Ave. cost per kwh sold | n.a. | n.a. | n.a. | n.a. | 444 | 398 | 314 | 265 | 255 | 213 | 244 | 244 | 210 | 208 | 220 | 222 |
| Ave. profit per kwh sold | n.a. | n.a. | n.a. | n.a. | 227 | 178 | 100 | 119 | 133 | 145 | 104 | 115 | 140 | 141 | 148 | 146 |
| Rate of return on assets (%) | n.a. | n.a. | n.a. | n.a. | n.a. | 59 | 30 | 49 | 64 | 84 | 83 | 83 | 92 | 85 | 92 | 98 |
| **Ghana – VRA** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | — | — | — | — | — | — | — | — | — | — | 101 | 097 | 041 | 037 | 038 | 040 |
| Ave. cost per kwh sold | — | — | — | — | — | — | — | — | — | — | 042 | 059 | 035 | 022 | 020 | 021 |
| Ave. profit per kwh sold | — | — | — | — | — | — | — | — | — | — | 059 | 038 | 006 | 015 | 018 | 019 |
| Rate of return on assets (%) | — | — | — | — | — | — | — | — | — | — | 04 | 11 | 06 | 29 | 38 | 43 |
| **Malaysia – NEB** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | n.a. | 320 | 310 | 310 | 320 | 320 | 310 | 310 | 310 | 310 | 300 | 300 | 300 | 270 | 260 | 260 |
| Ave. cost per kwh sold | n.a. | 260 | 250 | 240 | 250 | 250 | 240 | 240 | 240 | 230 | 220 | 210 | 200 | 180 | 180 | 170 |
| Ave. profit per kwh sold | n.a. | 060 | 060 | 070 | 070 | 070 | 070 | 070 | 070 | 080 | 080 | 090 | 100 | 090 | 080 | 090 |
| Rate of return on assets (%) | n.a. | 72 | 66 | 74 | 68 | 76 | 88 | 90 | 76 | 70 | 82 | 96 | 101 | 92 | 81 | 87 |
| **Mexico – CFE** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | 067 | 069 | 095 | 099 | 085 | 109 | 134 | 141 | 147 | 138 | 136 | 142 | 187 | 177 | 180 | 175 |
| Ave. cost per kwh sold | 048 | 049 | 063 | 065 | 060 | 065 | 072 | 080 | 091 | 088 | 080 | 080 | 108 | 100 | 110 | 109 |
| Ave. profit per kwh sold | 019 | 020 | 032 | 034 | 025 | 044 | 062 | 061 | 056 | 050 | 056 | 062 | 079 | 077 | 070 | 070 |
| Rate of return on assets (%) | 08 | 17 | 38 | 42 | 24 | 48 | 65 | 72 | 54 | 41 | 50 | 68 | 97 | 99 | 92 | 85 |
| **Singapore – PUB** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | n.a. | n.a. | n.a. | 246 | 245 | 239 | 242 | 238 | 241 | 239 | 232 | 228 | 234 | 229 | 225 | 219 |
| Ave. cost per kwh sold | n.a. | n.a. | n.a. | 184 | 173 | 175 | 174 | 162 | 152 | 152 | 170 | 155 | 143 | 125 | 118 | 104 |
| Ave. profit per kwh sold | n.a. | n.a. | n.a. | 062 | 072 | 064 | 068 | 076 | 089 | 087 | 062 | 073 | 091 | 114 | 107 | 115 |
| Rate of return on assets (%) | n.a. | n.a. | n.a. | 64 | 75 | 70 | 81 | 99 | 116 | 108 | 70 | 81 | 110 | 142 | 169 | 189 |
| **Bogota – EEEB** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | 123 | 117 | 104 | 092 | 087 | 114 | 111 | 133 | 112 | 096 | 112 | 105 | 124 | 113 | 107 | 098 |
| Ave. cost per kwh sold | 051 | 055 | 056 | 053 | 056 | 053 | 056 | 057 | 066 | 060 | 065 | 065 | 081 | 069 | 066 | 059 |
| Ave. profit per kwh sold | 072 | 062 | 048 | 039 | 031 | 061 | 055 | 076 | 046 | 036 | 047 | 040 | 043 | 044 | 041 | 039 |
| Rate of return on assets (%) | 220 | 216 | 135 | 83 | 61 | 157 | 130 | 180 | 91 | 74 | 91 | 71 | 78 | 81 | 90 | 99 |
| **Medellin – EPM** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | 089 | 095 | 065 | 070 | 076 | 082 | 087 | 080 | 093 | 090 | 084 | 085 | 091 | 101 | 106 | 101 |
| Ave. cost per kwh sold | n.a. | n.a. | n.a. | 031 | 038 | 036 | 041 | 044 | 049 | 045 | 048 | 054 | 059 | 062 | 052 | n.a. |
| Ave. profit per kwh sold | n.a. | n.a. | n.a. | 039 | 038 | 046 | 046 | 036 | 044 | 045 | 036 | 031 | 032 | 039 | 054 | n.a. |
| Rate of return on assets (%) | n.a. | n.a. | n.a. | 122 | 114 | 148 | 153 | 88 | 87 | 99 | 72 | 54 | 60 | 82 | 110 | n.a. |
| **Cali – CVC/Chidzal (bulk)** | | | | | | | | | | | | | | | | |
| Ave revenue per kwh sold | 107 | 094 | 082 | 069 | 063 | 094 | 088 | 082 | 069 | 057 | 075 | 069 | 082 | 088 | 107 | n.a. |
| Ave cost per kwh sold | 057 | 044 | 057 | 069 | 063 | 050 | 050 | 050 | 057 | 057 | 057 | 075 | 063 | 063 | 063 | n.a. |
| Ave. profit per kwh sold | 050 | 050 | 025 | 00 | 00 | 044 | 038 | 032 | 012 | 00 | 018 | – 006 | 019 | 035 | 044 | n.a. |
| Rate of return on assets (%) | n.a. | 64 | 34 | 06 | 04 | 63 | 56 | 65 | 20 | 09 | 37 | neg. | 25 | 37 | 42 | n.a. |

## ~~Growth of Public Power Supply in Developing Countries 1950-70 and IBRD Contribution~~

| | (1) Ave. annual growth of generation 1950-68 (%) | (2) Installed Generating Capacity 1968 (MW) | (3) Absolute Increase in Installed Capacity 1950-68 (MW) | (4) IBRD/IDA-Financed Capacity (MW) | (5) IBRD/IDA-~~Financed~~ Financed Capacity as % of Total Installed 1968 (4)/(2) | (6) Total Increment 1950-68 (4)/(3) | (7) Power as % of Total IBRD/IDA Disbursements through 12/31/70 (%) |
|---|---|---|---|---|---|---|---|
| America | | | | | | | |
| Brazil | 8.8 | 7446 | 5649 | 2181 | 29.2 | 38.6 | 86.0 x |
| Mexico | 9.9 | 4864 | 3853 | 3739 | 76.8 | 97.0 | 62.1 x |
| Argentina | 6.4 | 4118 | 2728 | 720 | 17.4 | 26.3 | 84.6 x |
| Colombia | 11.1 | 1689 | 1449 | 916 | 54.2 | 63.2 | 44.5 x |
| Peru | 10.3 | 869 | 769 | 240 | 27.6 | 31.2 | 28.8 |
| Venezuela | 13.4 | 1928 | 1768 | 350 | 18.1 | 19.7 | 47.0 |
| Chile | 6.0 | 1090 | 740 | 544 | 49.9 | 73.5 | 49.0 |
| Ecuador | 24.5 | 197 | 192 | 26 | 13.1 | 13.5 | 16.0 |
| Guatemala | 12.0 | 129 | 111 | — | — | — | 42.8 |
| Bolivia | 5.7 | 140 | 95 | 38 | 27.1 | 40.0 | 88.2 |
| Haiti | 8.9 | 20 | 15 | — | — | — | — |
| Dominican Rep. | 12.8 | 203 | 183 | — | — | — | — |
| El Salvador | 14.3 | 148 | 129 | 108 | 72.9 | 83.7 | 41.4 |
| Uruguay | 6.8 | 469 | 269 | 226 | 48.1 | 84.0 | 57.0 |
| Honduras | 16.5 | 73 | 67 | 30 | 41.0 | 44.7 | 35.1 |
| Paraguay | 8.2 | 86 | 65 | — | — | — | — |
| Jamaica | 12.9 | 157 | 136 | 99 | 63.0 | 72.7 | 67.4 |
| Nicaragua | 16.8 | 117 | 112 | 83 | 70.9 | 74.1 | 67.5 |
| Costa Rica | 9.6 | 213 | 174 | 94 | 44.1 | 54.0 | 43.6 |
| Panama | 11.5 | 124 | 103 | 4 | 3.2 | 3.8 | 22.5 |
| Trinidad & Tobago | 16.7 | 203 | 186 | 100 | 49.2 | 53.7 | 78.7 |
| Subtotal | 8.9 | 24,283 | 18,793 | 9498 | 39.1 | 50.5 | 57.1 |
| Asia | | | | | | | |
| India | 13.2 | 12,974 | 11,261 | 1,513 | 11.6 | 13.4 | 10.9 |
| Pakistan | 22.0 | 1,741 | 1,669 | 455 | 26.1 | 27.2 | 22.6 |
| Indonesia | 6.2 | 652 | 495 | — | — | — | — |
| Philippines | 13.9 | 1,243 | 1,059 | 356 | 28.6 | 33.6 | 44.1 |
| Thailand | 23.2 | 860 | 830 | 280 | 32.5 | 33.7 | 32.3 |
| Korea (South) | 15.9 | 1,274 | 1,079 | — | — | — | — |
| Iran | 15.7 | 1,089 | 1,009 | 130 | 11.9 | 12.8 | 13.9 |
| Burma | 12.4 | 193 | 168 | — | — | — | — |
| Vietnam (South) | 12.5 | 453 | 403 | — | — | — | — |
| Afghanistan | 17.9 | 221 | 216 | — | — | — | — |
| China (Taiwan) | 13.3 | 1940 | 1664 | — | — | — | 4.8 |
| Ceylon | 12.0 | 187 | 154 | 125 | 66.8 | 81.1 | 91.9 |
| Nepal | 13.6 | 32 | 29 | — | — | — | — |
| Malaysia | 9.5 | 610 | 482 | 380 | 62.2 | 78.8 | 69.3 x |
| Iraq | 14.8 | 370 | 330 | — | — | — | — |
| Saudi Arabia | 24.7 | 188 | 183 | — | — | — | — |
| Cambodia | 10.5 | 63 | 53 | — | — | — | — |
| Syria | 9.6 | 138 | 113 | — | — | — | — |
| Yemen A.R. | — | — | — | — | — | — | — |
| Hong Kong | 15.5 | 1054 | 944 | — | — | — | — |
| Laos | 19.8 | 8 | 7 | — | — | — | — |
| Israel | 14.5 | 1012 | 903 | — | — | — | — |
| Lebanon | 13.0 | 422 | 382 | 73 | 17.2 | 19.1 | 100.0 |
| Papua & N. Guinea | 21.1 | 33 | 31 | — | — | — | — |
| Jordan | 19.1 | 40 | 38 | — | — | — | — |
| Singapore | 12.8 | 464 | 427 | 240 | 51.7 | 56.2 | 66.6 x |
| Southern Yemen | 14.0 | 56 | 52 | — | — | — | — |
| Subtotal | 13.7 | 27,317 | 23,981 | 3,552 | 13.0 | 14.8 | 19.8 |

## Table 1.4

## Growth of Public Power Supply in Developing Countries 1950-70 and IBRD Contribution

| | (1) Ave. annual growth of generation 1950-68 (%) | (2) Installed Generating Capacity 1968 (MW) | (3) Absolute Increase in Installed Capacity 1950-68 (MW) | (4) IBRD/IDA-Financed Capacity (MW) | (5) IBRD/IDA-Financed Capacity as % of Total Installed 1968 (4)/(2) | (6) IBRD/IDA-Financed Capacity as % of Total Increment 1950-68 (4)/(3) | (7) Power as % of Total IBRD/IDA Disbursements through 12/31/70 (%) |
|---|---|---|---|---|---|---|---|
| **Africa** | | | | | | | |
| Nigeria | 13.5 | 480 | 457 | — | — | — | 60.3 |
| Egypt | 14.2 | 2486 | 2266 | — | — | — | — |
| Ethiopia | 17.7 | 136 | 123 | 32 | 23.5 | 26.0 | 30.6 x |
| Congo (Zayre) | 15.7 | 185 | 167 | — | — | — | — |
| Sudan | 16.9 | 97 | 88 | — | — | — | 9.9 |
| Morocco | 7.4 | 461 | 310 | — | — | — | — |
| Algeria | 4.6 | 639 | 310 | 135 | 21.1 | 21.1 | 12.4 |
| Tanzania | 11.7 | 102 | 79 | — | — | — | 5.8 |
| Kenya | 8.8 | 153 | 126 | — | — | — | — |
| Ghana | 28.9 | 599 | 591 | 512 | 85.4 | 86.6 | 97.7 x |
| Uganda | 23.7 | 157 | 150 | — | — | — | 18.3 |
| Malagasy | 9.4 | 62 | 50 | — | — | — | — |
| Cameroon | 9.5 | 20 | 15 | — | — | — | — |
| Upper Volta | 19.0 | 11 | 10 | — | — | — | — |
| Mali | 14.6 | 10 | 9 | — | — | — | — |
| Tunisia | 7.8 | 219 | 153 | — | — | — | — |
| Malawi | 24.4 | 39 | 38 | — | — | — | 1.7 |
| Ivory Coast | 27.2 | 85 | 83 | — | — | — | — |
| Zambia | 39.0 | 431 | 426 | 352 | 81.6 | 82.6 | 48.2 |
| Niger | 20.5 | 11 | 10 | — | — | — | — |
| Guinea | 15.5 | 12 | 10 | — | — | — | — |
| Senegal | 12.5 | 95 | 73 | — | — | — | — |
| Chad | 21.0 | 15 | 14 | — | — | — | — |
| Burundi | inf. | 5 | 5 | — | — | — | — |
| Rwanda | 26.5 | 35 | 34 | — | — | — | — |
| Somalia | 9.7 | 6 | 3 | — | — | — | — |
| Dahomey | 15.3 | 12 | 10 | — | — | — | — |
| Sierra Leone | 15.4 | 31 | 27 | 13 | 41.9 | 48.1 | 100.0 |
| Libya | 16.2 | 169 | 160 | — | — | — | — |
| Togo | 17.8 | 8 | 7 | — | — | — | — |
| Cent. Afr. Rep. | 22.0 | 14 | 13 | — | — | — | — |
| Liberia | 22.0 | 47 | 45 | — | — | — | 1.3 |
| Mauritania | 23.3 | 25 | 24 | — | — | — | — |
| Subtotal | 13.0 | 6,857 | 5,896 | 1,044 | 15.2 | 17.7 | 24.3 |
| **Europe** | | | | | | | |
| Turkey | 16.4 | 1617 | 1442 | 54 | 3.3 | 3.7 | 21.8 |
| Spain | 11.2 | 13,146 | 10,946 | — | — | — | — |
| Yugoslavia | 13.6 | 4,357 | 3,857 | 384 | 8.8 | 9.9 | 21.4 |
| Portugal | 11.3 | 1,868 | 1,596 | 385 | 20.6 | 24.1 | 100.0 |
| Greece | 13.9 | 1,798 | 1,575 | — | — | — | — |
| Ireland | 9.7 | 1,290 | 1,024 | — | — | — | 100.0 |
| Subtotal | 12.0 | 24,076 | 20,440 | 823 | 3.4 | 4.0 | 22.8 |

Table 16.1

TEN POWER COMPANIES - AVERAGE PRICES, COSTS AND PROFITS PER UNIT OF ELECTRICITY AND RATE OF RETURN TO AVERAGE NET FIXED ASSETS, 1955-1970

(Prices & Costs in US¢ Equivalent)

| | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Argentina - SEGBA** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | n.a. | n.a. | n.a. | n.a. | n.a. | 3.40 | 3.50 | 3.60 | 3.60 | 3.70 | 4.40 | 4.90 | 3.80 | 4.10 | 3.70 | 3.30 |
| Ave. cost per kwh sold | n.a. | n.a. | n.a. | n.a. | n.a. | 2.50 | 2.70 | 2.50 | 2.70 | 2.90 | 3.00 | 3.20 | 2.60 | 2.30 | 2.30 | 2.30 |
| Ave. profit per kwh sold | n.a. | n.a. | n.a. | n.a. | n.a. | 0.90 | 0.80 | 1.10 | 0.90 | 0.80 | 1.40 | 1.70 | 1.20 | 1.80 | 1.40 | 1.00 |
| Rate of return on assets (%) | n.a. | n.a. | n.a. | n.a. | n.a. | 16.2 | 14.9 | 18.0 | 11.9 | 8.5 | 13.5 | 15.8 | 11.4 | 17.3 | 14.6 | 10.9 |
| **Brazil - Furnas** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | - | - | - | - | - | - | - | - | 0.55 | 0.55 | 1.21 | 1.39 | 1.38 | 1.38 | 1.29 | 1.61 |
| Ave. cost per kwh sold | - | - | - | - | - | - | - | - | 0.19 | 0.20 | 0.40 | 0.44 | 0.44 | 0.51 | 0.53 | 0.58 |
| Ave. profit per kwh sold | - | - | - | - | - | - | - | - | 0.36 | 0.35 | 0.81 | 0.95 | 0.94 | 0.87 | 0.76 | 1.03 |
| Rate of return on assets (%) | - | - | - | - | - | - | - | - | 0.9 | 5.9 | 12.5 | 18.5 | 17.0 | 18.4 | 19.3 | 18.7 |
| **Ethiopia - EELPA** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | n.a. | n.a. | n.a. | n.a. | 6.71 | 5.76 | 4.14 | 3.84 | 3.88 | 3.58 | 3.48 | 3.59 | 3.50 | 3.49 | 3.68 | 3.68 |
| Ave. cost per kwh sold | n.a. | n.a. | n.a. | n.a. | 4.44 | 3.98 | 3.14 | 2.65 | 2.55 | 2.13 | 2.44 | 2.44 | 2.10 | 2.08 | 2.20 | 2.22 |
| Ave. profit per kwh sold | n.a. | n.a. | n.a. | n.a. | 2.27 | 1.78 | 1.00 | 1.19 | 1.33 | 1.45 | 1.04 | 1.15 | 1.40 | 1.41 | 1.48 | 1.46 |
| Rate of return on assets (%) | n.a. | n.a. | n.a. | n.a. | n.a. | 5.9 | 3.0 | 4.9 | 6.4 | 8.4 | 8.3 | 8.3 | 9.2 | 8.5 | 9.2 | 9.8 |
| **Ghana - VRA** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | - | - | - | - | - | - | - | - | - | - | 1.01 | 0.97 | 0.41 | 0.37 | 0.38 | 0.40 |
| Ave. cost per kwh sold | - | - | - | - | - | - | - | - | - | - | 0.42 | 0.59 | 0.35 | 0.22 | 0.20 | 0.21 |
| Ave. profit per kwh sold | - | - | - | - | - | - | - | - | - | - | 0.59 | 0.38 | 0.06 | 0.15 | 0.18 | 0.19 |
| Rate of return on assets (%) | - | - | - | - | - | - | - | - | - | - | 0.4 | 1.1 | 0.6 | 2.9 | 3.8 | 4.3 |
| **Malaysia - NEB** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | n.a. | 3.20 | 3.10 | 3.10 | 3.20 | 3.20 | 3.10 | 3.10 | 3.10 | 3.10 | 3.00 | 3.00 | 3.00 | 2.70 | 2.60 | 2.60 |
| Ave. cost per kwh sold | n.a. | 2.60 | 2.50 | 2.40 | 2.50 | 2.50 | 2.40 | 2.40 | 2.40 | 2.30 | 2.20 | 2.10 | 2.00 | 1.80 | 1.80 | 1.70 |
| Ave. profit per kwh sold | n.a. | 0.60 | 0.60 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.80 | 0.80 | 0.90 | 1.00 | 0.90 | 0.80 | 0.90 |
| Rate of return on assets (%) | n.a. | 7.2 | 6.6 | 7.4 | 6.8 | 7.6 | 8.8 | 9.0 | 7.6 | 7.0 | 8.2 | 9.6 | 10.1 | 9.2 | 8.1 | 8.7 |
| **Mexico - CFE** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | 0.67 | 0.69 | 0.95 | 0.99 | 0.85 | 1.09 | 1.34 | 1.41 | 1.47 | 1.38 | 1.36 | 1.42 | 1.87 | 1.77 | 1.80 | 1.79 |
| Ave. cost per kwh sold | 0.48 | 0.49 | 0.63 | 0.65 | 0.60 | 0.65 | 0.72 | 0.80 | 0.91 | 0.88 | 0.80 | 0.80 | 1.08 | 1.00 | 1.10 | 1.09 |
| Ave. profit per kwh sold | 0.19 | 0.20 | 0.32 | 0.34 | 0.25 | 0.44 | 0.62 | 0.61 | 0.56 | 0.50 | 0.56 | 0.62 | 0.79 | 0.77 | 0.70 | 0.70 |
| Rate of return on assets (%) | 0.8 | 1.7 | 3.8 | 4.2 | 2.4 | 4.8 | 6.5 | 7.2 | 5.4 | 4.1 | 5.0 | 6.8 | 9.7 | 9.9 | 9.2 | 8.5 |
| **Singapore - PUB** Ave. cost per kwh sold (corrected) | 0.63 | 0.61 | 0.96 | 0.78 | 0.74 | 0.82 | 0.92 | 0.94 | 1.07 | 1.04 | 0.94 | 0.91 | 1.19 | 1.09 | 1.18 | 1.18 |
| Ave. profit per kwh sold | 0.04 | 0.08 | 0.19 | 0.21 | 0.11 | 0.27 | 0.42 | 0.47 | 0.40 | 0.34 | 0.42 | 0.51 | 0.68 | 0.68 | 0.62 | 0.61 |
| Ave. revenue per kwh sold | n.a. | n.a. | n.a. | 2.46 | 2.45 | 2.39 | 2.42 | 2.38 | 2.41 | 2.39 | 2.32 | 2.28 | 2.34 | 2.29 | 2.25 | 2.19 |
| Ave. cost per kwh sold | n.a. | n.a. | n.a. | 1.84 | 1.73 | 1.75 | 1.74 | 1.62 | 1.52 | 1.52 | 1.70 | 1.55 | 1.43 | 1.25 | 1.18 | 1.04 |
| Ave. profit per kwh sold | n.a. | n.a. | n.a. | 0.62 | 0.72 | 0.64 | 0.68 | 0.76 | 0.89 | 0.87 | 0.62 | 0.73 | 0.91 | 1.14 | 1.07 | 1.15 |
| Rate of return on assets (%) | n.a. | n.a. | n.a. | 6.4 | 7.5 | 7.0 | 8.1 | 9.9 | 11.6 | 10.8 | 7.0 | 8.1 | 11.0 | 14.2 | 16.9 | 18.9 |
| **Bogota - EEEB** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | 1.23 | 1.17 | 1.04 | 0.92 | 0.87 | 1.14 | 1.11 | 1.33 | 1.12 | 0.96 | 1.12 | 1.05 | 1.24 | 1.13 | 1.07 | 0.98 |
| Ave. cost per kwh sold | 0.51 | 0.55 | 0.56 | 0.53 | 0.56 | 0.53 | 0.56 | 0.57 | 0.66 | 0.60 | 0.65 | 0.65 | 0.81 | 0.69 | 0.66 | 0.59 |
| Ave. profit per kwh sold | 0.72 | 0.62 | 0.48 | 0.39 | 0.31 | 0.61 | 0.55 | 0.76 | 0.46 | 0.36 | 0.47 | 0.40 | 0.43 | 0.44 | 0.41 | 0.39 |
| Rate of return on assets (%) | 22.0 | 21.6 | 13.5 | 8.3 | 6.1 | 15.7 | 13.0 | 18.0 | 9.1 | 7.4 | 9.1 | 7.1 | 7.8 | 8.1 | 9.0 | 9.9 |
| **Medellin - EPM** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | 0.89 | 0.95 | 0.65 | 0.70 | 0.76 | 0.82 | 0.87 | 0.80 | 0.93 | 0.90 | 0.84 | 0.85 | 0.91 | 1.01 | 1.06 | 1.01 |
| Ave. cost per kwh sold | n.a. | n.a. | n.a. | 0.31 | 0.38 | 0.36 | 0.41 | 0.44 | 0.49 | 0.45 | 0.48 | 0.54 | 0.59 | 0.62 | 0.52 | 0.47 |
| Ave. profit per kwh sold | n.a. | n.a. | n.a. | 0.39 | 0.38 | 0.46 | 0.46 | 0.36 | 0.44 | 0.45 | 0.36 | 0.31 | 0.32 | 0.39 | 0.54 | 0.54 |
| Rate of return on assets (%) | n.a. | n.a. | n.a. | 12.2 | 11.4 | 14.8 | 15.3 | 8.8 | 8.7 | 9.9 | 7.2 | 5.4 | 6.0 | 8.2 | 11.0 | n.a. |
| **Cali - CVC/Chidral (bulk)** | | | | | | | | | | | | | | | | |
| Ave. revenue per kwh sold | 1.07 | 0.94 | 0.82 | 0.69 | 0.63 | 0.94 | 0.88 | 0.82 | 0.69 | 0.57 | 0.75 | 0.69 | 0.82 | 0.88 | 1.07 | n.a. |
| Ave. cost per kwh sold | 0.57 | 0.44 | 0.57 | 0.69 | 0.63 | 0.50 | 0.50 | 0.50 | 0.57 | 0.57 | 0.57 | 0.75 | 0.63 | 0.63 | 0.63 | n.a. |
| Ave. profit per kwh sold | 0.50 | 0.50 | 0.25 | 0.0 | 0.0 | 0.44 | 0.38 | 0.32 | 0.12 | 0.0 | 0.18 | -0.06 | 0.19 | 0.25 | 0.44 | n.a. |
| Rate of return on assets (%) | n.a. | 6.4 | 3.4 | 0.6 | 0.4 | 6.3 | 5.6 | 6.5 | 2.0 | 0.9 | 3.7 | neg. | 2.5 | 3.7 | 4.2 | n.a. |

# Chapter XIV Comparative Performances under The loans

| | SEGBA | FURNAS | EELPA | VRA | NEB | PUB | CFE | EEEB | EPM | CVG |
|---|---|---|---|---|---|---|---|---|---|---|
| Capacity financed by Bks | 970 | 1,600 | 74 | 588 | 500 | 240 | 4,491 | 455 | 306 | 217 |
| Δ Installed Capacity (Total) (60-70) | 1147 | 2294 | 85 | 588 | 514 | 467 | 5233 | 460 | 306 | 217 |
| Av. Ann. Inc. Rate (%) (60-70) | 60-70 | 63-70 (65-70) | 60-70 | 67-70 | 63-70 (60-70) | 63-70 (60-70) | 60-70 | 60-70 | 60-70 | 60-70 |
| Demand Peak | 12.9 | 12.4 | 32.5 (29.4) | 17.0 | 6.0 | 17.0 (14.5) | 14.0 (12.3) | 10.5 * | 14 | 9.5 | 13.1 |
| Sales | 13.4 | 11.1 | 19.3 | 19.1 | 24.5 | 15.3 (14.9) | 15.0 (12.9) | 17.8 | 12.9 | 7.7 | 13.5 |
| Customers | 11.2 | 7.6 | — | 13.3 | — | 9.9 (10.0) | 10.5 (10.5) | 23.7 | 8.1 | 5.7 | — |
| Net Revenues | 15.0 | 12.2 | 42.8 | 16.7 | 69.1 | 20.0 (18.4) | 22.0 (19.9) | 22.8 | 8.0 | 10 | 12 |
| ANFAS | 15.1 | 16.8 | 17.8 | 11.1 | 1.7 | 18.0 (16.9) | 13.7 (10.1) | 20.3 | n.a. | n.a. | 15.3 |
| Installed Capacity | 13.4 | 10.2 | 33.8 (20.6) | 11.4 | — | 16.3 (15.9) | 16.3 (13.8) | 17.2 | 16.5 | 12.4 ** | 10.1 |
| Energy Sales / employee | 6.9 | 6.0 | 11.4 | 8.9 | 21.2 | 9.5 (8.1) | 7.8 (5.9) | 4.1 | 6.5 | 8.9 | n.a. |
| Total Amount disbursed up to Dec. 1970 (US$ mln) from loans fully or nearly disbursed | 144.4 | 125.2 | 23.4 | 47.0 | 111.2 | 37.6 | 411.0 | 78.1 | 67.9 | 44.6 |
| Bank $ / KW installed | 148.9 | 78.3 | 316.2 | 79.9 | 222.4 | 156.7 | 91.5 | 171.6 | 221.9 | 205.5 |
| | 4 | 1 | 10 | 2 | 8 | 5 | 3 | 6 | 7 | 9 |

* in Mexico as a whole
** for 1964-1970 only

Total Capacity financed by Banks : 9441 MW.
Δ Inst. Cap. : 11 311 MW ⇒ 83.5%

| | SEGBA | Furnas | EELPA | VRA | NEB | CFE | PUB | EEEB | EPM | CVG |
|---|---|---|---|---|---|---|---|---|---|---|
| Planning: Utility | x x x x | — — — x | x | — — | x x x x x | x x x x x x x | x x x x | — | — | — |
| Consult. | — — — — | x x x — | — | x x | x x x x | — — — x x x | — — x x | x x x | x x x | x |
| Peak Dem. | x x x x | — x x x | x | x x | x x x x | x x x x x | x x x x | x | x | |
| Energy | — — — — | x x x x | — | — — | x — — — | x | — — — — | | x x | |
| Years intervals | 6, 4, 9 | 13, 6, 8, 9 | 8, 6 | 10, 9 | 10, 10, 6, 7, 12 | 5, 9, 10, 10 | 6, 5, 7, 7 | 9 | 10, 9, 7 | |
| Reserve criterion: | ∅, 1st unit, 1st unit | ∅, energy + dry years, 11 dry years + cap. + dry condition | dry loss, dry loss + 1 unit | 1st unit, 1st unit | 1 unit, 1 unit + energy + dry loss | 1 unit + dry loss, 1 unit + dry loss, 1 unit + dry loss | 1st unit 115 MW, 1st unit 115 MW, 2 units out of service + Spin. Res., 2 units out + Spin. Res., 2 units out + Spin. Res. | 1st unit | 1, 1st unit, 1st unit | |

2.60

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Rate structure

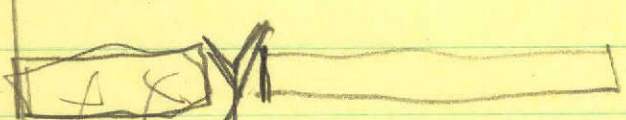
Walters Capital.
Unit Costs.
Lack of minor Amounts in 65-66.
Rate structure.
Management Consultants.

beat a dead horse.
beat an ailing horse.

| 69 | 70 | % | 1961 | 62 | 63 | 64 | 65 | 66 | 67 | 68 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Salaries, Wages | 80 | 34 | 35 | 45 | 47 | 44 | 44 | 41 |
| | | Fuel | | 22 | 23 | 21 | 20 | 19 | 18 | 19 |
| | | Purchased power | E | 15 | 11 | 6 | 5 | 4 | 4 | 4 |
| | | Others | | 12 | 14 | 16 | 16 | 14 | 15 | 15 |
| | | Depreciation | 20 | 17 | 17 | 11 | 12 | 18 | 20 | 20 |
| 100 | 100 | Total | | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2.3 | 2.3 | Unit cost Mills/kwh US ¢. | 2.7 | 2.5 | 2.7 | 2.9 | 3.0 | 3.2 | 2.6 | 2.3 |

| | 69 | 70 |
|---|---|---|
| Salaries, Wages | | |
| Fuel | | |
| Power | | |
| Taxes | 4,404 | 4,708 |
| Others | | |
| Depreciation | | |

Mgt Consultants hired in 1963 for reorganisation of Seqba's department and warehouses and material movements and for control of financial progress, works cost control.



| | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
|---|---|---|---|---|---|---|---|---|---|
| Current ratio | .75 | .85 | .66 | .58 | .99 | 1.37 | 1.73 | | |

| | Initials | Date |
|---|---|---|
| Prepared By | | |
| Approved By | | |

45-813 EYE-EASE
45-813 20/20 BUFF
NATIONAL Made in U.S.A.

PUB

| | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Absolute Value (M$ m/n) | | | | | | | | | | | | | |
| Administration | 2.59 | 2.45 | 2.48 | 2.89 | 3.35 | 13.27 | 15.20 | 4.69 | 5.22 | 4.90 | 4.04 | 5.24 | 5.47 |
| Other Operational Costs | 6.12 | 6.26 | 6.92 | 7.65 | 8.51 | | | 12.73 | 12.78 | 13.40 | 13.19 | 13.32 | 15.20 |
| Fuel | 9.37 | 8.82 | 10.20 | 11.61 | 9.97 | 10.51 | 12.08 | 17.97 | 17.98 | 14.76 | 17.06 | 19.53 | 18.67 |
| Depreciation | 7.86 | 8.46 | 9.52 | 9.54 | 10.58 | 10.11 | 11.11 | 12.22 | 15.01 | 21.04 | 21.02 | 21.84 | 21.69 |
| Total | 25.94 | 25.99 | 29.12 | 32.09 | 32.41 | 33.89 | 38.39 | 47.61 | 50.99 | 54.10 | 55.31 | 59.93 | 61.03 |
| % of Total Cost | | | | | | | | | | | | | |
| Administration | 10.0 | 9.4 | 8.5 | 9.0 | 10.3 | 39.2 | 39.6 | 9.9 | 10.2 | 9.0 | 7.3 | 8.8 | |
| Other Operational Costs | 23.6 | 24.1 | 23.8 | 23.8 | 26.3 | | | 26.7 | 25.1 | 24.8 | 23.9 | 22.2 | |
| Fuel | 36.1 | 33.9 | 35.0 | 36.2 | 30.8 | 31.0 | 31.5 | 37.7 | 35.3 | 27.3 | 30.8 | 32.6 | |
| Depreciation | 30.3 | 32.6 | 32.7 | 31.0 | 32.6 | 29.8 | 28.9 | 25.7 | 29.4 | 38.9 | 38.0 | 36.4 | |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | |
| Cost per kwh sold (US¢) | | | | | | | | | | | | | |
| Administration | 0.17 | 0.16 | 0.14 | 0.15 | 0.16 | 0.61 | 0.61 | 0.17 | 0.16 | 0.13 | 0.09 | 0.11 | 0.09 |
| Other Operational Costs | 0.41 | 0.40 | 0.40 | 0.40 | 0.41 | | | 0.46 | 0.40 | 0.36 | 0.30 | 0.27 | 0.26 |
| Fuel | 0.63 | 0.56 | 0.59 | 0.61 | 0.48 | 0.48 | 0.49 | 0.66 | 0.56 | 0.40 | 0.39 | 0.39 | 0.32 |
| Depreciation | 0.53 | 0.54 | 0.55 | 0.52 | 0.51 | 0.46 | 0.45 | 0.45 | 0.47 | 0.57 | 0.48 | 0.44 | 0.37 |
| Total | 1.74 | 1.66 | 1.68 | 1.68 | 1.56 | 1.55 | 1.55 | 1.74 | 1.59 | 1.46 | 1.26 | 1.21 | 1.04 |

19784 16726

| | Initials | Date |
|---|---|---|
| Prepared By | | |
| Approved By | | |

45-813 EYE-EASE
45-913 20/20 BUFF
NATIONAL Made in U.S.A.

# EEEB: Composition of Operating Costs 1960 – 70

| | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Absolute Value (millions of current pesos)** | | | | | | | | | | | |
| Salaries + wages [1] | 8.24 | 13.34 | 14.21 | 20.61 | 24.55 | 29.05 | 35.68 | 46.11 | 54.53 | 64.93 | 75.81 |
| Fuel | n.a. | 1.59 | 1.97 | 2.25 | 4.61 | 5.01 | 8.95 | 4.49 | 4.05 | 5.23 | 5.46 |
| Other costs [2] | n.a. | 0.49 | 3.81 | 5.09 | 8.80 | 12.91 | 14.48 | 19.80 | 19.35 | 33.27 | 30.60 |
| Revalued Depreciation | 7.56 | 9.02 | 9.56 | 21.59 | 22.52 | 32.15 | 37.65 | 67.31 | 65.16 | 71.04 | 88.58 |
| Total | 18.53 | 24.44 | 29.55 | 49.54 | 60.48 | 79.12 | 96.76 | 137.76 | 143.09 | 171.47 | 200.45 |
| **% of Total Cost** | | | | | | | | | | | |
| Salaries + Wages [1] | 44.5 | 54.6 | 48.1 | 41.6 | 40.6 | 36.7 | 36.8 | 33.5 | 38.1 | 38.1 | 37.8 |
| Fuel | | 6.5 | 6.7 | 4.5 | 7.6 | 6.3 | 9.3 | 3.3 | 2.8 | 3.1 | 2.7 |
| Other costs [2] | | 2.0 | 12.9 | 10.3 | 14.6 | 16.3 | 15.0 | 14.4 | 13.5 | 19.4 | 15.3 |
| Revalued Depreciation | 40.8 | 36.9 | 32.3 | 43.6 | 37.2 | 40.7 | 38.9 | 48.8 | 45.6 | 41.4 | 44.2 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| **Breakdown of Cost/Kwh sold (45¢)** | | | | | | | | | | | |
| Salaries + Wages [1] | 0.21 | 0.30 | 0.28 | 0.29 | 0.25 | 0.24 | 0.24 | 0.25 | 0.24 | 0.21 | 0.20 |
| Fuel | | 0.04 | 0.04 | 0.03 | 0.05 | 0.04 | 0.06 | 0.02 | 0.02 | 0.02 | 0.01 |
| Other Costs [2] | | 0.01 | 0.08 | 0.07 | 0.09 | 0.11 | 0.10 | 0.11 | 0.08 | 0.11 | 0.08 |
| Revalued Depreciation | 0.19 | 0.21 | 0.19 | 0.30 | 0.23 | 0.27 | 0.25 | 0.37 | 0.28 | 0.24 | 0.23 |
| Total | 0.47 | 0.56 | 0.58 | 0.69 | 0.62 | 0.66 | 0.65 | 0.75 | 0.62 | 0.58 | 0.52 |

[1] Including pensions + family subsidies

[2] General Administration, Billing and collecting, miscellaneous expenditures, purchased energy, but not including contract payments or payments to city.

| | Initials | Date |
|---|---|---|
| Prepared By | | |
| Approved By | | |

45-813 EYE-EASE
45-913 20/20 BUFF
Made in U.S.A.

# EPM : Composition of Operating Costs 1960-70

| | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Absolute Value (millions of current Rs)** | | | | | | | | | | | |
| Salaries + Wages [1] | 8.04 | 9.33 | 13.49 | 22.71 | 25.78 | 31.54 | 37.22 | 42.57 | 52.00 | 51.17 | 59.32 |
| Purchased Energy | n.a. | 1.31 | 0.99 | 0.02 | 0.13 | — | — | — | — | — | — |
| Other Costs | n.a. | 4.98 | 5.47 | 3.49 | 3.43 | 3.70 | 6.16 | 8.78 | 7.47 | 12.79 | 14.21 |
| Revalued Depreciation | 5.17 | 5.66 | 6.07 | 15.34 | 18.01 | 23.47 | 37.73 | 47.26 | 50.43 | 55.80 | 59.03 |
| Total | 16.94 | 21.28 | 25.82 | 41.06 | 47.35 | 58.71 | 83.13 | 98.61 | 109.90 | 119.76 | 132.56 |
| **As % of Cost** | | | | | | | | | | | |
| Salaries + Wages [1] | 47.5 | 43.8 | 52.2 | 54.1 | 54.5 | 53.7 | 44.8 | 43.2 | 47.3 | 42.7 | 44.8 |
| Purchased Energy | n.a. | 6.2 | 3.1 | 0.1 | 0.3 | — | — | — | — | — | — |
| Other Costs | n.a. | 23.4 | 21.2 | 8.5 | 7.2 | 6.3 | 7.4 | 8.9 | 6.8 | 10.7 | 10.7 |
| Revalued Depreciation | 30.5 | 26.6 | 23.5 | 37.3 | 38.0 | 40.0 | 47.8 | 47.9 | 45.9 | 46.6 | 44.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| **Breakdown of cost/kwh sold (US ¢)** | | | | | | | | | | | |
| Salaries + Wages | 0.17 | 0.18 | 0.23 | 0.27 | 0.25 | 0.26 | 0.24 | 0.25 | 0.27 | 0.22 | 0.21 |
| Purchased Energy | n.a. | 0.03 | 0.01 | 0.00 | 0.00 | — | — | — | — | — | — |
| Other Costs | n.a. | 0.10 | 0.09 | 0.04 | 0.03 | 0.03 | 0.04 | 0.05 | 0.04 | 0.06 | 0.05 |
| Revalued Depreciation | 0.11 | 0.11 | 0.10 | 0.19 | 0.17 | 0.19 | 0.26 | 0.27 | 0.26 | 0.24 | 0.21 |
| Total | 0.37 | 0.42 | 0.43 | 0.50 | 0.45 | 0.48 | 0.54 | 0.57 | 0.57 | 0.52 | 0.47 |

3.73

[1] Including pension payments.

Appendix Table 14. 4

# APPENDIX TABLE 14. : INVESTMENT PROGRAMS PARTLY FINANCED BY IBRD: STRUCTURE OF FINANCING.

| | SEGBA Period 1962-65 | SEGBA Period 1966-70 | FURNAS Period 1958-65 | FURNAS Period 1966-70 | ENALPA Period 1963-68 | CRA Period 1962-65 | CRA Period 1966-70 |
|---|---|---|---|---|---|---|---|
| 1. Net Internal Cash Generation | 22.4 | 54.8 | 14.5 | 20.0 | 35.0 | — | 1.0 |
| 2. Domestic Contribution: | | | | | | | |
| from private sector | 3.2 | 1.8 | 2.1 | — | 1.6 | — | — |
| from public sector: share capital | 18.0 | 0.5 | 3.3 | 4.6 | — | 46.8 | 1.4 |
| loans | — | — | 43.3 | 23.0 | — | — | — |
| sub total public | 18.0 | 0.5 | 46.6 | 27.6 | — | 46.8 | 1.4 |
| Total domestic contribution | 21.2 | 1.8 | 48.5 | 47.6 | 1.6 | 46.8 | 1.4 |
| 3. Foreign Borrowing: | | | | | | | |
| Suppliers credits | 24.2 | 5.6 | — | — | 0.1 | — | — |
| Foreign bond issues | 4.9 | — | — | — | — | — | — |
| Foreign private loans | — | 4.7 | — | — | — | — | — |
| Bilateral official development assistance | — | — | 0.5 | 10.3 | 2.1 | 22.5 | 33.6 |
| Regional Development Bank | — | — | — | 0.1 | — | — | — |
| IBRD | 27.6 | 37.5 | 36.5 | 22.0 | 61.2 | 28.4 | 64.0 |
| Total Foreign Borrowing | 56.6 | 47.8 | 37.0 | 32.4 | 63.4 | 53.2 | 97.6 |
| 4. Total Sources | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| financing from working capital and cash | | | | | | | |
| 5. Total Sources (US$ million): Actual | 302.8 | 712.29 | 210.79 | 59.78 | 34.81 | 176.95 | 20.29 |
| Forecast | 285.31 | 275.75 | 305.60 | 234.50 | 30.77 | 168.00 | 5.45 |

| | CFE Period 1958-61 | CFE Period 1962-65 | Mexican Power Sector Period 1965-66 | Mexican Power Sector Period 1968-69 | LHEB Period 1958-62 | LHEB Period 1962-68 | CDE Period 1957-66 | CDE Period 1967-70 |
|---|---|---|---|---|---|---|---|---|
| 1. Net Internal Cash Generation | 8.4 (10.8)e | 7.9 (15.7)e | — (15.3)e | 0.6 (13.5)e | 38.6 | 35.1 | 33.6 | 42.5 |
| 2. Domestic Contribution: | | | | | | | | |
| from private sector | 12.3 | 11.3 | 12.3 | 5.0 | 5.6 | 3.3 | 2.5 | 2.5 |
| from public sector: share capital | 33.5a) | 20.5b) | 26.3c) | 33.0d) | 17.3 | 16.5 | — | — |
| loans | — | — | — | 5.0 | 10.7 | — | 30.1 | 5.3 |
| sub total public | 33.5 (31.1)e | 20.5 (15.3)e | 26.3 [illegible] | 38.0 (34.4)e | 31.0 | 16.5 | 30.1 | 5.3 |
| Total domestic contribution | 46.2 (51.7)e | 38.8 (35.2)e | 38.8 (26.3)e | 51.9 (42.0)e | 36.6 | 23.3 | 32.6 | 7.8 |
| 3. Foreign Borrowing: | | | | | | | | |
| Suppliers credits | 28.6 | 24.0 | 6.8 | 2.4 | — | — | — | 20.3 |
| Foreign bond issues | — | 4.1 | 7.3 (12.2) | 13.0 | — | — | — | — |
| Foreign private loans | 5.5 | 6.4 | 38.6 | 57.6 | — | — | — | — |
| Bilateral official development assistance | — | — | | | 11.7 | — | — | — |
| Regional Development Bank | — | — | | | — | — | — | — |
| IBRD | 11.0 | 21.0 | 16.5 | 15.4 | 24.6 | 41.6 | 31.8 | 28.9 |
| Total Foreign Borrowing | 45.4 | 55.3 | 60.8 (76.8) | 47.5 | 36.3 | 41.6 | 33.5 | 49.7 |
| 4. Total Sources | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| financing from working capital and cash | 3.6 | 8.8 | | | | | | |
| 5. Total Sources (US$ million): Actual | 430.2 | 613.3 | 365.7 | 566.3 | 208.1 | 82.4 | 65.19 | 116.70 |
| Forecast | 247.1 | 417.4 | 303.1 | 501.2 | 187.5 | 172.7 | 44.31 | 94.20 |

| | ISH Period 1957-62 | ISH Period 1962-68 | EEEB Period 1960-62 | EEEB Period 1963-65 | EEEB Period 1966-70 |
|---|---|---|---|---|---|
| 1. Net Internal Cash Generation | 51.0 | 59.0 | 24.4 | 13.5 | 41.9 |
| 2. Domestic Contribution: | | | | | |
| from private sector | — | — | n.a. | n.a. | n.a. |
| from public sector: share capital | — | — | — | — | — |
| loans | 20.0 | 4.0 | n.a. | n.a. | n.a. |
| sub total public | 20.0 | 4.0 | 25.1 | 21.5 | 22.8 |
| Total domestic contribution | 20.0 | 4.0 | 25.1 | 21.5 | 22.8 |
| 3. Foreign Borrowing: | | | | | |
| Suppliers credits | 1.0 | 1.0 | — | — | 11.7 |
| Foreign bond issues | — | — | — | — | — |
| Foreign private loans | — | — | — | — | — |
| Bilateral official development assistance | — | — | — | — | — |
| Regional Development Bank | — | — | — | — | — |
| IBRD | 28.0 | 36.0 | 50.5 | 65.0 | 23.6 |
| Total Foreign Borrowing | 29.0 | 37.0 | 50.5 | 65.0 | 35.3 |
| 4. Total Sources | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 5. Total Sources (US$ million): Actual | 20.21 | 41.56 | 12.14 | 72.32 | 42.97 |
| Forecast | 53.58 | 111.74 | 31.48 | 73.08 | 77.60 |

Private [illegible] share capital loans

Suppliers credits [illegible] Foreign private loans [illegible] [illegible]

a) includes 14.4% from proceeds of the gross consumption tax.
b) includes 11.6% " " " " " "
c) includes 14.3% from " " " "
d) includes 12.9% from " " " "
e) For intercountry comparison purposes, the proceeds of the gross consumption tax have not been included in the coverage of CFE [illegible] S [illegible].
When the proceeds of the gross consumption tax have been included in the net internal cash generation, figures for the corresponding financing pattern are in brackets.

F A F A F A F A F A F A F A F A F A

9.6
26.6
5.4
41.6

74.39
157.65
832.04
1149.40
917.36

20.2

# Dibumenato

| | Reviews | % | Bomb Crup. | % |
|---|---|---|---|---|
| Africa | 74.39 | 6.5 | 291.3 | 9.6 |
| America | 917.36 | 79.8 | 1757.5 | 58.4 |
| Asia | 157.65 | 13.7 | 809.9 | 26.6 |
| Europe | | 0 | 164.0 | 5.4 |
| Total | 1149.40 | 100 | 3022.7 | 100 |

| US$ mlns. | O.K. SEGBA 1962-65 and 1968-70 | O.K. FURNAS 1958-70 | O.K. EEEB 1960-70 | O.K. EPM 1957-68 | O.K. EELPA 1964-70 | O.K. VRA 1962-66 | O.K. NEB 1958-70 | O.K. CFE 1958-69 | O.K. PUB 1963-70 | O.K. TOTAL 1958-70 Total | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Net internal cash generation | 197.1 | 151.6 | 48.9 | 36.3 | 16.7 | — | 101.4 | 78.7 | 68.6 | 699.3 | 16.5 |
| 2. Domestic contributions: | | | | | | | | | | | |
| from private sector | 23.7 | 5.1 | | — | 0.8 | — | 16.5 | 201.9 | 4.3 | 252.3 | 6 |
| from public sector: | | | n.a. | | | | | | | | |
| share capital | 60.9 | 39.0 | | — | | 57.2 | 43.2 | 506.3 a) | | 706.6 a) | 16.5 |
| loans | 0.7 | 318.7 | | 8.8 | | — | 26.4 | 36.9 b) | 25.3 | 416.8 b) | 10 |
| subtotal public | 61.6 | 357.7 | | 8.8 | — | 57.2 | 69.6 | 543.2 | 25.3 | 1123.4 | 26.5 |
| Total domestic contribution | 85.3 | 362.8 | 45.4 | 8.8 | 0.8 | 57.2 | 86.1 | 745.1 | 29.6 | 1421.1 | 33.5 |
| 3. Foreign borrowing: | | | | | | | | | | | |
| Supplier credits | 87.8 | — | 5.1 e) | 1.0 | | 8.3 | — | 248.0 c) | 22.3 | 372.5 f) | 9 |
| Foreign bond issues | 26.3 | — | | — | | — | — | 150.0 c) | | 176.3 d) | 4 |
| " private loans | 10.0 | — | | — | | — | — | 455.7 | | 465.7 | 11 |
| Bilateral official assistance | — | 51.6 | | — | 1.3 | 24.8 | 1.4 | — | | 79.1 | 2 |
| IBRD | 151.9 | 126.6 | 92.5 | 55.7 | 25.8 | 46.6 | 108.6 | 356.1 | 51.4 | 1015.2 | 24 |
| Total foreign borrowing | 276.0 | 179.0 | 97.6 | 56.7 | 27.1 | 79.7 | 110.0 | 1,209.8 | 73.7 | 2109.6 | 50 |
| 4. Total Sources | 558.4 | 693.4 | 191.9 | 101.8 | 44.6 | 136.9 | 297.5 | 2033.6 | 171.9 | 4,230.0 | 100 |

Footnotes:

a) includes $ 262 million from the proceeds of the power consumption taxe in Mexico.

b) does not include $ 178.5 million debt service which were refinanced in 1965-68 by Nafinsa in Mexico.

c) includes $ 19.5 million of supplier credits obtained under joint financing.

d) does not include $ 33.2 million of debt service in Mexico which were refinanced from the proceeds of foreign bonds issued in 1965-66.

e) consists of joint financing credits.

f) includes $ 24.6 million of joint-financing credits.

# Table 14.7 : IBRD Projects Implementation

| | Construction Period | Project Scope | Construction Cost LC | Construction Cost FX | Construction Cost Total | Cost/kW US $ | Construction Period | Project Scope | Construction Cost LC | Construction Cost FX | Construction Cost Total | Cost/kW US $ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 11 | 12 | 13 |
| **Hydroelectric Plants** | | | | | | | | | | | | |
| | | | ~~49.5~~ | ~~50.5~~ | ~~100~~ | | | | ~~59.5~~ | ~~40.5~~ | ~~100~~ | |
| Subtotal | 57 | 3326 MW | 304.7 | 311.1 | 615.8 | 185 | 62 | 4060.4 MW | 464.88 | 316.63 | 781.51 | 193 |
| Total I a) | 54 | 5028 MW | | | 822.39 | 164 | 61 | 5838.4 MW | | | 1105.28 | 189 |
| **Thermal Plants** | | | | | | | | | | | | |
| | | | ~~36.2~~ | ~~63.8~~ | ~~100~~ | | | | ~~42.1~~ | ~~57.9~~ | | |
| Sub total | 39 | 1353.5 MW | 94.74 | 166.92 | 261.66 | 193 | 38 | 1401.75 MW | 113.97 | 156.88 | 270.85 | 193 |
| Total | 36 | 2889.5 MW | | | 468.04 | 162 | 36 | 3212.25 | | | 554.8 | 173 |
| Total (including Heute Diesel Station) II a) | 36 | 2889.5 MW | | | 468.04 | 162 | 36 | 3230.25 MW | | | 561.28 | 174 |
| Total Generation (I + II) a) | 47 | 7917.5 MW | | | 1290.43 | 163 | 53 | 9068.65 MW | | | 1666.56 | 184 |
| **Transmission** | | km | | | | Cost/km | | km | | | | Cost/km |
| Sub total | | 8416 km | 98.27 | 166.03 | 264.30 | 31.4 | | 9898 | 162.10 | 130.05 | 292.15 | 29.5 |
| Total | | | | | | | | 17,498 | | | 562.04 | 32.12 |
| **Distribution** | | | | | | | | 2,130 km + | | | | |
| Sub total | | 2082 | 14.20 | 21.92 | 36.12 | 17.4 | 15,765 | connections | 10.13 | 22.13 | 32.26 | 13.8 |
| Total | | 6800 | | | 617.85 | | | 17770 km | | | 564.35 | |
| **Rural electrification** | | | | | | | | | | | | |
| Sub total | n.a. | 22.7 MW | 8.12 | 5.43 | 13.55 | | 65 | 22.1 MW | 2.37 | 4.9 | 7.27 | |
| Total | | | | | 85.23 | | | | | | 81.15 | |
| Total Projects | | | | | 2257.81 | | | | | | 2874.10 | |

a) do not include completed plants in Columbia with 1x33 MW in thermal plant and 216 MW in hydro plants for which no data on actual costs are available.

# Table ~~17.2~~ No. 1

| | Forecasting and Planning made by: | | Capacity planning based primarily on: | | Forecast interval (yrs) | Reserve Criterion |
|---|---|---|---|---|---|---|
| | Utility | Consultants | Peak Demand | Energy Requirements | | |
| SEGBA: 1st loan | x | | x | | 6 | 0 |
| 2nd and 3rd loans | x | | x | | 4–9 | largest unit out ~~largest unit out~~ |
| Furnas: 1st loan | x (Shareholders with Bank revisions) | | x | | 13 | 0 |
| 2nd loan | | x | | x | 6 | dry years condition |
| 3rd and 4th loans | | x | x | x | 8–9 | firm capacity in dry conditions |
| EELPA: 1st loan | x | | x | x | 8 | loss in dry years out |
| 2nd loan | x | | x | x | 6 | loss and largest unit |
| VRA: 1st and 2nd loans | | x | x | | 10–9 | largest unit out |
| NEB: 1st loan | x | | x | x | 10 | largest unit out |
| 2nd loan | x | x | x | | 10 | largest out in average water yr |
| 3rd, 4th and 5th loans | x | x | x | | 6,7,12 | largest out and loss in dry years |
| CFE: 1st and 2nd loans | x | | | | | |
| 3rd loan | x | | x | x | 5 | 0 |
| 4th loan | x | | x | | 9 | largest unit out |
| 5th, 6th and 7th loans | x | x | x | | 10 | largest out or 15% of demand. |
| PUB: 1st loan | x | | x | | 6 | 2 units out |
| 2nd loan | x | | x | | 5 | 2 units out and spinning reserve. |
| 3rd and 4th loans | x | x | x | | 7 | |
| EPM: 1st, 2nd and 3rd loans | | x and Bank | x | x | 10-9-7 | largest unit out |
| EEEB: 1st loan | | x | x | x | 9 | 0 |
| 2nd loan | | x and Bank | x | | 9 | largest unit out |
| 3rd loan | | x | x | x | 6 | largest unit out |

P.T.O ↓

| | | | | | |
|---|---|---|---|---|---|
| CVC : 1st and 2nd loans | x and Bank | x | x | 10-6 | 0 |
| CHIDRAL 3rd and 4th loans | x | x | | 4-9 | 0 |
| 5th loan | x | x | | 10 | largest unit out. |

291 / 10 = 8.1

Table 175 14.4

# The Utilities: Forecast and Actual Peak Demands, Reserves and Load Factors, 1970 a)

| | SEGBA c) | FURNAS | EELPA | VRA | NEB | DUB A | DUB B | Colombia EEEB A | Colombia EEEB B | Colombia EPM | Colombia CHIVOR | Mexico – CFE d) Interconnected System Central A | Central B | Oriental A | Occidental A | Total B | North A | North B | North West A | North West B | North East A | North East B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Forecast** b) | | | | | | | | | | | | | | | | | | | | | | |
| Installed Capacity | 1790 | 1432 | 121 | 588 | 563 | 644 | 617 | 620 | 456 | 582 | 490 | 2300 | 2,242 | 587 | 735 | 1,601 | 334 | 334 | 338 | 370 | 619 | 501 |
| Peak Demand | 1617 | – | 73 | 363 | 363 | 481 | 440 | 523 | 452 | 418 | 356 | 1840 | 1786 | 523 | 504 | 1,252 | 221 | 212 | 253 | 261 | 480 | 402 |
| Gross Reserve | 173 | – | 48 f) | 225 g) | 220 f) | 78 | 177 | 97 | 4 | 164 | 134 | 460 | 456 | 64 | 231 | 349 | 113 | 122 | 85 | 109 | 139 | 99 |
| **Actual** | | | | | | | | | | | | | | | | | | | | | | |
| Installed Capacity | 1840 | 2294 | 94 | 588 | 623 | 644 | | 588 | | 443 | 248 | 2117 | | 1270 | 659 | 1929 | 341 | | 332 | | 516 | |
| Peak Demand | 1697 | 2069 | 50 | 378 | 363 | 377 | | 479 | | 371 | 228 | 1935 | | 860 | 741 | 1593 | 290 | | 259 | | 458 | |
| Gross Reserve | 143 | 225 | 44 f) | 210 | 260 f) | 267 | | 109 | | 72 | 20 | 182 | | 410 | -82 | 336 | 51 | | 73 | | 58 | |
| Gross Reserve as % of demand | 8.4 | 10.9 | 88.0 | 55.5 | 71.6 | 70.8 | | 22.8 | | 19.4 | 8.8 | 9.4 | | | | 21.1 | 17.6 | | 28.2 | | 12.7 | |
| **Actual Effective Peak** | | | | | | | | | | | | | | | | | | | | | | |
| Available Capacity | 1772 | 2091 | 67 | 475 | n.a. b) | 455 | | 428 i) | | 443 | 205 | 2053 | | n.a. | n.a. | n.a. | 286 | | 264 | | 455 | |
| Peak Demand | 1697 | 2043 | 45 | 360 | n.a. | 346 | | 423 i) | | 371 | 222 | 1935 | | n.a. | n.a. | n.a. | 273 | | 255 | | 424 | |
| Spare Capacity | 75 e) | 48 | 22 | 115 | n.a. | 109 | | 5 i) | | 72 | -17 | 118 | | n.a. | n.a. | n.a. | 13 | | 9 | | 31 | |
| Spare Capacity as % of demand | 4.4 | 2.3 | 48.9 | 31.9 | n.a. | 31.5 | | 1.2 i) | | 19.4 | -7.6 | 6.1 | | | | | 4.8 | | 3.5 | | 7.3 | |
| **Annual Load Factor (%)** | | | | | | | | | | | | | | | | | | | | | | |
| Forecast | 54 | – | 54 | 76 | 74 | 50 | 56 | 49 | 54 | 56 | 58 | 58 | 59 | 63 | 53 | 58 | 71 | 69 | 56 | 60 | 61 | 60 |
| Actual | 57 | 54 | 57 | 85 | 73.9 | 67 | | 54 | | 60 | 53 | 62 | | 71 | 43 | 58 | 66 | | 56 | | 65 | |

a) Installed Capacity is shown as of the end of the calendar year, December 31, for all cases except EELPA and NEB, whose fiscal years end on September 10 and August 31, respectively; peak demands are given for the year on the corresponding dates.

double space

31.8 : ← Percentage (over respective)

Effective (eg: fluctuations of last month, year, etc.) Peak: North, NE, NW

a) Forecasts are taken from the latest appraisal reports examined for each utility. An additional set of forecasts in the cases of PUB, EEEB and CFE are included whole earlier appraisal report load factor forecasts were substantially different from the more recent ones:

| | | | |
|---|---|---|---|
| PUB: | A – Loan 473-SI | ( | 1966 ) |
| | B – Loan 503-SI | ( | 1967 ) |
| EEEB: | A – Loan 313-CO | ( | 1962 ) |
| | B – Loan 537-CO | ( | 1968 ) |
| CFE: | A – Loan 316-ME | ( | 1962 ) |
| | B – Loan 436-ME | ( | 1965 ) |

modified for Central and Interconnected systems to be comparable with actual developments during frequency conversion.

b) Figures for installed ~~and available~~ capacity refer to SEGBA's own system, while those for demand and load factor include supplies purchased from other utilities and resold by SEGBA.

c) ~~All data in Mexico~~ are for 1969 due to unavailability of 1970 actual data for gross generation in each system. ~~for load factors~~

d) ~~Spare capacity of the effective peak including allowance for energy~~ Available capacity includes power actually purchased from other suppliers ~~has + 75 MW in 1970.~~ for an amount of 100 MW.

e) Includes some capacity that may be unavailable in poor hydrological years (about 22 to 26 MW in EELPA)

f) Large reserve partly to permit guaranteed supplies to aluminum smelter.

g) No data are available on the effective peak or on energy sales from NEB's interconnected system.

h) for 1969 – No data available for 1970.

Mr. Gabriel - Dated March 2, 71 Price Napal memo Mr. Eliot - 2121

## PUBLIC POWER PROJECTS: SEMI-ANNUAL LOAN DISBURSEMENTS AND RELATED SIGNIFICANT DATES

($ millions)

| Loan No. | Date of Loan Agreement | Effective Date (a) | Closing Date (b) | Date of First Disbursement | Date of Last Disbursement | June '50 | Dec. '50 | June '51 | Dec. '51 | June '52 | Dec. '52 | June '53 | Dec. '53 | June '54 | Dec. '54 | June '55 | Dec. '55 | June '56 | Dec. '56 | June '57 | Dec. '57 | June '58 | Dec. '58 | June '59 | Dec. '59 | June '60 | Dec. '60 | June '61 | Dec. '61 | June '62 | Dec. '62 | June '63 | Dec. '63 | June '64 | Dec. '64 | June '65 | Dec. '65 | June '66 | Dec. '66 | June '67 | Dec. '67 | June '68 | Dec. '68 | June '69 | Dec. '69 | June '70 | Dec. '70 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 211 BR | Oct. 3, 1958 | Dec. 2, 1958<br>Feb. 7, 1959 | Sept. 30, 1963<br>Dec. 31, 1964<br>Oct. 31, 1965<br>Jan. 31, 1966 | March 1959 | Feb. 1966 | | | | | | | | | | | | | | | | | | | 5.01 | 11.57 | 6.34 | 4.41 | 5.13 | 7.37 | 6.89 | 8.29 | 5.58 | 5.35 | 2.30 | 3.48 | .51 | .29 | .47 | | | | | | | | | | 72.99 |
| 403 BR | Feb. 26, 1965 | April 27, 1965<br>July 8, 1965 | April 1, 1971<br>April 1, 1972 | Oct. 1965 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | .08 | .73 | 1.67 | 2.58 | 5.23 | 5.59 | 5.77 | 8.07 | 10.04 | 7.96 | 4.50 | 52.22 |
| 474 BR | Dec. 19, 1966 | April 15, 1967<br>June 1, 1967 | April 1, 1972 | - | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 565 BR | Oct. 23, 1968 | March 31, 1969<br>Feb. 18, 1969 | March 31, 1975 | April 1969 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 677 BR | May 25, 1970 | Oct. 1, 1970<br>Sept. 29, 1970 | Aug. 31, 1977 | - | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | .11 | .18 | .98 | .46 | 1.73 |
| 308 AR | Jan. 19, 1962 | April 19, 1962<br>April 19, 1962 | Dec. 31, 1964<br>June 30, 1965 | April 1962 | July 1965 | | | | | | | | | | | | | | | | | | | | | | | | | 5.11 | 10.58 | 29.23 | 19.38 | 13.68 | 9.29 | 5.60 | .48 | | | | | | | | | | 93.35 |
| 525 AR | Jan. 25, 1968 | April 1, 1968<br>April 1, 1968 | Dec. 31, 1969<br>April 15, 1970 | April 1968 | May 1970 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | .02 | 9.42 | 11.60 | 18.96 | 11.00 | | 51.00 |
| 644 AR | Nov. 14, 1969 | Jan. 9, 1970<br>Feb. 9, 1970 | Sept. 30, 1973 | March 1970 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2.34 | 4.94 | 7.28 |
| 120 PAK | June 20, 1955 | Sept. 18, 1955<br>Jan. 19, 1956 | June 30, 1957<br>March 31, 1958<br>Dec. 31, 1958<br>June 30, 1959<br>Dec. 31, 1959 | Jan. 1956 | Dec. 1959 | | | | | | | | | | | | | 9.61 | 1.57 | 1.08 | 1.14 | .16 | .06 | .08 | .08 | | | | | | | | | | | | | | | | | | | | | | | | 13.78 |
| 191 PAK | April 23, 1958 | July 22, 1958<br>Sept. 26, 1958 | Dec. 31, 1962<br>Dec. 31, 1963<br>Dec. 31, 1964<br>Dec. 31, 1965 | Nov. 1958 | Feb. 1966 | | | | | | | | | | | | | | | | | .18 | .16 | .86 | .40 | 1.84 | 2.33 | 2.08 | .98 | 1.56 | 1.01 | .43 | .53 | .26 | 1.10 | .15 | .13 | | | | | | | | | | 14.00 |
| 234 PAK | Aug. 13, 1959 | Oct. 12, 1959<br>Jan. 5, 1960 | Sept. 30, 1961<br>Sept. 30, 1962<br>Dec. 31, 1963<br>June 30, 1964<br>June 30, 1965 | Jan. 1960 | Oct. 1965 | | | | | | | | | | | | | | | | | | | | .62 | .55 | .05 | .05 | .15 | .14 | .11 | .21 | .14 | .02 | .34 | .02 | | | | | | | | | | 2.40 |
| 488 PAK | March 15, 1967 | Aug. 1, 1967<br>May 10, 1967 | June 30, 1970<br>June 30, 1971 | May 1967 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | .67 | .29 | 1.89 | 7.27 | 3.11 | 1.06 | 2.49 | 1.28 | 18.06 |
| 375 ET | May 8, 1964 | July 7, 1964<br>July 3, 1964 | Jan. 31, 1969<br>Dec. 31, 1970<br>June 30, 1971 | July 1964 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2.14 | 2.08 | 2.89 | 4.10 | 2.72 | 2.62 | 2.38 | 1.37 | 1.90 | .86 | .22 | .15 | .03 | 23.46 |
| 596 ET | May 9, 1969 | Aug. 8, 1969<br>Aug. 8, 1969 | Dec. 31, 1973 | Dec. 1969 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | .56 | 1.33 | 1.99 | 3.88 |
| 310 GH | Feb. 8, 1962 | April 1, 1962<br>Feb. 8, 1962 | June 25, 1967<br>Aug. 16, 1967<br>April 25, 1971 | Feb. 1963 | April 1970 | | | | | | | | | | | | | | | | | | | | | | | | | | 3.24 | 6.65 | 9.98 | 6.24 | 7.63 | 5.96 | 3.34 | 2.22 | 1.30 | .10 | | .24 | | .10 | | 47.00 |
| 618 GH | June 23, 1969 | Oct. 1, 1969<br>Oct. 1, 1969 | Dec. 31, 1973 | May 1970 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | .02 | .03 | .05 |
| 210 MA | Sept. 22, 1958 | Dec. 21, 1958<br>Dec. 11, 1958 | Aug. 31, 1965<br>Aug. 31, 1966 | Jan. 1959 | Sept. 1966 | | | | | | | | | | | | | | | | | | | .26 | 1.11 | 1.18 | 1.53 | 1.83 | 1.48 | 4.14 | 5.75 | 3.96 | 3.02 | .90 | 1.14 | 1.09 | .18 | .52 | .51 | | | | | | | | | 28.60 |
| 350 MA | Aug. 7, 1963 | Nov. 5, 1963<br>Oct. 25, 1963 | Aug. 31, 1968<br>July 31, 1969 | Nov. 1963 | Aug. 1969 | | | | | | | | | | | | | | | | | | | | | | | | | | | .69 | .81 | 5.58 | 3.77 | 4.74 | 8.58 | 7.91 | 6.37 | 5.68 | 3.60 | 1.26 | 1.48 | .66 | | 51.13 |
| 458 MA | July 26, 1966 | Sept. 30, 1966<br>Aug. 30, 1966 | Sept. 30, 1970<br>March 31, 1972 | Oct. 1966 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | .59 | 2.69 | 2.36 | 4.64 | 5.53 | 4.68 | 1.95 | 1.86 | 1.40 | 25.70 |
| 579 MA | Jan. 9, 1969 | March 15, 1969<br>March 4, 1969 | March 31, 1973 | June 1969 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | .03 | .26 | .22 | 2.61 | 3.12 |
| 700 MA | July 16, 1970 | Sept. 30, 1970<br>Sept. 29, 1970 | Jan. 31, 1975 | Dec. 1970 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | .06 | .06 |
| 12 ME | Jan. 6, 1949 | Feb. 5, 1949<br>March 15, 1949 | Dec. 31, 1952<br>Dec. 31, 1953<br>Dec. 31, 1954<br>July 31, 1955<br>March 31, 1956 | April 1949 | March 1956 | 4.56 | 2.68 | 2.29 | 1.41 | 1.95 | 2.88 | 1.67 | 1.32 | 1.08 | .33 | 1.05 | .18 | .49 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 21.89 |
| 13 ME | Jan. 6, 1949 | Feb. 5, 1949<br>March 15, 1949 | Dec. 1, 1949<br>July 1, 1950 | March 1949 | June 1950 5/ | 1.30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.30 |
| 56 ME | Jan. 11, 1952 | April 10, 1952<br>June 10, 1952 | Dec. 31, 1955<br>July 31, 1957<br>July 31, 1958<br>July 31, 1959 | June 1952 | July 1959 | | | | | .59 | 5.58 | 2.76 | 3.45 | 1.05 | 2.52 | 2.58 | 1.27 | 2.83 | 1.53 | 1.07 | 1.21 | .71 | 1.88 | .26 | .41 | | | | | | | | | | | | | | | | | | | | | | | 29.70 |
| 194 ME | May 5, 1958 | July 4, 1958<br>July 1, 1958 | June 30, 1962<br>Dec. 31, 1962 | Aug. 1958 | Jan. 1963 | | | | | | | | | | | | | | | | | 5.41 | 1.14 | 3.05 | 3.15 | 4.06 | 5.60 | 5.93 | 2.68 | 2.97 | .01 | | | | | | | | | | | | | | | | | 34.00 |
| 316 ME | June 20, 1962 | Aug. 19, 1962<br>July 26, 1962 | Oct. 1, 1964<br>April 1, 1965 | Aug. 1962 | Feb. 1965 | | | | | | | | | | | | | | | | | | | | | | | | | | 14.31 | 21.54 | 38.81 | 25.26 | 28.77 | 1.31 | | | | | | | | | | | | 130.00 |
| 436 ME | Dec. 15, 1965 | Jan. 15, 1966<br>Jan. 17, 1966 | June 30, 1967 | Jan. 1966 | April 1968 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 31.91 | 23.76 | 13.58 | 25.17 | 15.58 | | | | | 110.00 |
| 544 ME | June 28, 1968 | Sept. 1, 1968<br>Aug. 30, 1968 | Dec. 31, 1969 1/<br>March 31, 1971 2/ | Oct. 1968 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 19.91 | 27.60 | 26.76 | 5.32 | 3.59 | 83.18 |
| 659 ME | Feb. 27, 1970 | June 1, 1970<br>May 22, 1970 | June 30, 1972 | May 1970 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 11.81 | 25.33 | 37.14 |
| 473 SI | Nov. 4, 1966 | Nov. 30, 1966<br>Nov. 28, 1966 | Dec. 31, 1967<br>June 30, 1968 | Dec. 1966 | July 1968 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 7.22 | 1.11 | .41 | .49 | .31 | | | | | 9.54 |
| 595 SI | April 25, 1969 | July 15, 1969<br>June 17, 1969 | Sept. 30, 1972 | Dec. 1969 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | .15 | 5.32 | 5.99 | 11.46 |
| 503 SI | July 5, 1967 | Aug. 31, 1967<br>July 26, 1967 | Dec. 31, 1969 3/<br>Dec. 31, 1970 3/<br>Dec. 31, 1971 3/<br>Dec. 31, 1972 4/ | Aug. 1967 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | .59 | 3.14 | 4.70 | 4.26 | 2.77 | 3.29 | .82 | 19.57 |
| | | | | | | 5.86 | 2.68 | 2.29 | 1.41 | 2.54 | 8.46 | 4.43 | 4.77 | 2.13 | 2.85 | 3.63 | 1.45 | 12.93 | 3.10 | 2.15 | 2.35 | .87 | 7.53 | 6.91 | 17.08 | 11.69 | 12.39 | 14.84 | 16.91 | 19.95 | 43.60 | 64.68 | 74.54 | 53.60 | 56.92 | 23.43 | 14.79 | 49.78 | 46.60 | 30.92 | 42.21 | 36.32 | 56.31 | 61.80 | 63.57 | 54.19 | 53.03 | 997.59 |

1/ Part A

2/ Part B

3/ Part I

4/ Part II

5/ Refunded by Loan No. 24 ME

(a) The first date represents the date established in the Loan Agreement and the second date is the actual effective date.

(b) The first date represents the initial closing date. All others represent subsequent changes.

Controller's
3/19/71

FORECASTS | ACTUAL

| | 1 Construction Period | 2 Project Scope | 3 Construction Cost (US$ million) L.C. | 4 F.X. | 5 Total | cost/KW US$ | 7 | 8 Construction Period | 9 Project Scope | 10 Construction cost (US$ million) L.C. | 11 F.X. | 12 Total | 13 cost/KW US$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hydroelectric Plants** | 13 X | | | | | | | 97 | | | | | |
| Colombia: ~~Anchicaya ext~~ | 50 | 44MW | 9.06* | 5.30* | 14.36* | 326.2 | | 81 | 44MW | n.a | n.a | n.a | n.a |
| 1 Calima | 63 | 120MW | 9.80 | 18.90 | 28.70 | 239.2 | 86 | 117 | 120MW | 20.54 | 21.65 | 42.19 | 351.6 |
| ~~Laguneta ext~~ | 12 | 18MW | 1.41 | .99 | 2.40 | 133.7 | | 18 | 18MW | n.a | 1.51 | n.a | n.a |
| ~~Salto II ext~~ | 30 | 66MW | 5.93 | 4.51 | 10.44 | 158.2 | | 35 | 66MW | n.a | 8.70 | n.a | n.a |
| 2 El Colegio | 85 X | 300MW | 15.49 | 30.26 | 45.75 | 152.5 | | 85 | 300MW | 19.37 | 34.29 | 53.66 | 178 |
| ~~Cotaxtla ext~~ | 42 | 50MW | 6.43 | 5.82 | 12.25 | 245.0 | | 42 | 50MW | n.a | n.a | n.a | n.a |
| 3 Tuxpan | 50X | 35MW | 3.58 | 2.63 | 6.21 | 172.5 | | 61 | 36MW | 5.61 | 2.87 | 8.48 | 235.4 |
| 4 Guadalupe II | 63 | 210MW | 7.08 | 15.96 | 23.04 | 109.7 | | 82 | 270MW | 16.58 | 17.60 | 34.18 | 126.6 |
| ~~Guatape ext~~ | 48 | 264MW | 26.24 | 35.96 | 62.20 | 235.6 | | 60 | 264MW | n.a | n.a | n.a | n.a |
| Mexico: Miguel Aleman System | 78 | 155MW | 13.06 | 6.84 | 19.90 | 128 | → | 104 | 160.8MW | 33.44 | 6.52 | 39.96 | 248 |
| including: Santa Barbara | | | | | | | | 51 | 67.6MW | 5.56 | 2.05 | 7.61 | 112 X |
| San Bartolo I | | | | | | | | 68 | 25.2MW | 4.47 | 1.28 | 5.75 | 228 |
| El Durazno | | | | | | | | 102 | 18MW | 1.89 | 1.28 | 3.17 | 176 |
| Isctapantango | | | | | | | | 33 | 50MW | 0.50 | 1.44 | 1.94 | 117 |
| space → Puebla-Veracruz System | 66 | 353MW | 1.02 | 0.97 | 1.99 | 56 | → | | 30.5MW | 3.48 | 1.03 | 4.51 | 148 |
| including: Tepazolco | | | | | | | | 47 | 10.4MW | 1.01 | 0.53 | 1.54 | 141 |
| El Encanto | | | | | | | | 57 | 10MW | 1.26 | 0.44 | 1.70 | 170 |
| Minas I | | | | | | | | 54 | 9.6MW | 1.21 | 0.06 | 1.27 | 132 |
| space → Bombaca | 78 | 26MW | 0.43 | 0.10 | 0.53 | 204 | → | 50 | 2.6MW | 1.04 | 0.16 | 1.20 | 377 |
| ~~Cupatitzio~~ | | | | | | | | | | | | | |
| Alzate (Lic. Adolfo Lopez Victoria) | | | | | | | | | | | | | |
| Tingambato | 45 | 150MW | 9.21 | 7.63 | 16.84 | 112 | | 65 | 135MW | 19.28 | 5.93 | 25.21 | 187 |
| El Cobano | 36 | 55MW | 6.66 | 1.69 | 8.35 | 152 | | 59 | 52MW | 8.04 | 1.74 | 9.78 | 188 |
| Oviachic Portezuelo | | | | | | | | 35 | 19.2MW | 2.00 | 0.74 | 2.74 | 143 |
| Mocuzari | | | | | | | | 37 | 9.6MW | 1.35 | 0.36 | 1.71 | 178 |
| El Fuerte (~~Sinaloa~~) | | | | | | | X | 52 | 40MW | 4.56 | 1.42 | 5.98 | 150 |
| Temascal | 48 | 154MW | 7.76 | 5.42 | 13.18 | 85 | X | 65 | 154MW | 17.07 | 3.41 | 20.48 | 133 |
| Capatitzio | 55 | 73.6MW | 5.77 | 3.53 | 9.30 | 126 | | 65 | 63MW | 18.16 | 4.72 | 22.88 | 363 |
| Mazatepec | 59 | 156MW | 17.95 | 5.41 | 23.36 | 144* | | 74 | 156MW | 45.82 | 11.89 | 57.71 | 319* |
| Subtotal | 57 | 3326.0MW | 304.70 | 311.10 | 615.80 | 185 | | 62 | 4060.4 | 464.88 | 316.63 | 781.51 | 193 |
| | 1089 | | 49.5 | 50.5 | 100.00 | | | 1661 | | | | | |
| Mexico: Mazatepec 4th unit | 4 | 52MW | | | 6.58 | 144* | | 18 | 52MW | | | 8.53 | 319* |
| San Bartolo II | | 20MW | | | 2.90 | 145 | | | 19MW | | | 4.61 | 243 |
| Infiernillo (~~Mich~~) | | 602MW | | | 82.42 | 137 | | | 672MW | | | 111.18 | 165 |
| Santa Rosa | | 60MW | | | 14.67 | 245 | | | 60MW | | | 19.83 | 331 |
| Sanalona | | 14MW | | | 1.96 | 140 | | | 14MW | | | 2.26 | 161 |
| El Novillo | | 90MW | | | 30.41 | 338 | | | 90MW | | | 40.22 | 447 |
| La Venta | | 30MW | | | 10.54 | 351 | | | 30MW | | | 17.76 | 592 |
| Chilapan | | 18MW | | | 1.89 | 105 | | | 18MW | | | 3.31 | 217 |
| El Retiro | | 14MW | | | 4.90 | 348 | | | 21MW | | | 11.60 | 552 |
| El Salto | | 18MW | | | 3.14 | 174 | | | 18MW | | | 5.54 | 308 |
| Malpaso | | 720MW | | | 31.02 | 43 | | | 720MW | | | 80.22 | 115 |
| X X El Fuerte 3rd unit | | 20MW | | | 1.02 | 51 | | | 20MW | | | 1.10 | 55 |
| Total I | 54 | 5028MW | 353.77 | 363.68 | 822.39 | 164 | | 61 | 5838.4 | | 323.52 | 1105.28 | 189 |
| X Anchicaya X | 50 | 44MW | | | 15.14 | 344 | | 77 | 44MW | | | 17.01 | 387 |
| Thermal Plants | 1143 | | | | | | | 1756 | | | | | |
| Colombia: ~~Yumbo unit 1 and 2~~ | 60 | 22.5MW | 3.41 | 1.42 | 4.83 | 214.6 | | 53 | 20MW | n.a | n.a | 5.66 | 283.0 |
| 1 Yumbo unit 3 | 24 | 1x33MW | 1.24 | 4.40 | 5.64 | 170.9 | | 24 | 1x33MW | 2.77 | 3.70 | 6.47 | 196.1 |
| ~~Zipaquira unit 1~~ | 18 | 33MW | 4.00 | 2.83 | 6.83 | 207.1 | | 32 | 33MW | n.a | 3.22 | n.a | n.a |
| 2 Zipaquira unit 2 | 19 | 1x33MW | 1.64 | 7.02 | 8.66 | 231.1 | | 31 | 1x37.5MW | 2.48 | 5.60 | 8.08 | 215 |
| Mexico: Sonora System | n.a | 40MW | 2.88 | 2.66 | 5.54 | 139 | | | | | | | |
| including: Ciudad Obregon | | | | | | | | 21 | 3x5MW | 0.96 | 1.98 | 2.94 | 196 |
| Guaymas I unit 1&2 | | | | | | | | 42 | 2x12.5MW | 2.61 | 4.41 | 7.02 | 281 X |
| Guaymas (Potencia) | n.a | 1x30MW | 1.50 | 2.93 | 4.43 | 148 | | 40 | 1x33MW | 2.14 | 2.27 | 4.41 | 134 |
| Juarez | ~~57~~ | 1x5MW | 0.61 | 0.76 | 1.37 | 274 | | 24 | 3x5MW | 0.75 | 1.99 | 2.74 | 183 |
| Chihuahua | n.a | 2x25MW | 2.00 | 3.57 | 5.57 | 111 | | 40 | 3x15MW | 3.67 | 3.72 | 7.39 | 164 |
| Aldama | n.a | 6MW | 0.35 | 1.07 | 1.42 | 237 | | | | | | | |
| Motul and la Paz | 15 | 6.5MW | 1.00 | 1.62 | 2.62 | 403 | | | | | | | |
| Ciudad Victoria* | | | | | | | | 33 | 2x1MW | 0.37 | 0.26 | 0.63 | 315 |
| Merida * | | | | | | | | 28 | 1x6.25MW | 0.61 | 0.67 | 1.28 | 205 |
| Villahermosa * | | | | | | | | 23 | 2x2.25MW | 0.73 | 0.43 | 1.16 | 258 |
| La Laguna * * | | | | | | | | 24 | 1x33MW | 2.43 | 2.40 | 4.83 | 146 |
| Ciudad Victoria (ext) | | | | | | | | 19 | 1x2.5MW | 0.19 | 0.42 | 0.61 | 244 |
| Monterrey I | 22 | 2x15MW | 0.78 | 2.84 | 3.62 | 121 | | 29 | 2x15MW | 2.11 | 2.82 | 4.93 | 164 |
| Veracruz | 23 | 1x10MW | 0.46 | 1.37 | 1.83 | 183 | | 26 | 1x10MW | 1.50 | 1.43 | 2.93 | 293 |
| Subtotal | 39 | 1353.5MW | 94.74 | 166.92 | 261.66 | 193 | | 38 | 1401.75MW | 113.97 | 156.88 | 270.85 | 193 |
| Colombia: Yumbo 1 and 2 X | 50 | 1x12+1x10MW | | | 4.83 | 215 | | 30 | 2x10MW | | | 5.66 | 283 |
| Mexico: Valle de Mexico | | 1x150MW | | | 13.62 | 91 | | | 1x150MW | | | 17.91 | 119 |
| POZA RICA | | 3x39MW | | | 15.07 | 129 | | | 3x39MW | | | 22.17 | 189 |
| Delicias | | 3x33MW | | | 13.51 | 136 | | | 3x33MW | | | 18.78 | 190 |
| Monterrey II | | 3x75MW | | | 27.13 | 121 | | | 3x75MW | | | 31.18 | 139 |
| Rio Bravo | | 2x37.5MW | | | 9.20 | 123 | | | 2x37.5MW | | | 10.72 | 143 |
| Nava | | 1x37.5MW | | | 7.0 | 187 | | | 1x37.5MW | | | 13.34 | 356 |
| Tijuana unit 1,2,3 | | 3x75MW | | | 28.65 | 127 | | | 3x75MW | | | 36.82 | 164 |
| Tijuana unit 4 | | 1x82MW | | | 10.4 | 127 | | | 1x82MW | | | 10.57 | 129 |
| Jurdistan | | 2x6.25MW | | | 3.79 | 303 | | | 2x6.25MW | | | 4.16 | 333 |
| Merida unit 1&2 | | 2x6.25MW | | | 3.02 | 242 | | | 2x6.25MW | | | 4.00 | 320 |
| Popolobampo | | | | | 6.52 | 163 | | | 1x41MW | | | 10.51 | 256 |
| La Laguna unit 4 | | 1x40MW | | | 5.76 | 144 | | | 1x41.0MW | | | 8.67 | 211 |
| Salamanca I | | | | | | | | | 1x14MW | | | 1.48 | 106 |
| Salamanca II | | | | | | | | | 1x150MW | | | 18.10 | 121 |
| Guaymas unit 4 | | 1x40MW | | | 6.52 | 163 | | | 1x41MW | | | 13.15 | 325 |
| ~~Las Truchas~~ → Palenitos | | 2x14MW | | | 3.34 | 119 | | | 2x14MW | | | 4.59 | 164 |
| Tampico | | | | | | | | | 1x14MW | | | 2.07 | 148 X |
| Guadalajara (extending) | | | | | | | | | 2x14MW | | | 2.85 | 102 |
| Merida unit 4 | | | | | | | | | 1x14MW | | | 1.65 | 118 |
| Acapulco | | | | | | | | | 1x14MW | | | 1.57 | 112 |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ~~Total~~ | | | | | | | | | | | | |
| 2 | Total | 471 ~~422~~ | ~~38~~ 36 | 29 ~~22.5~~ | ~~102.15*~~ ~~171.17*~~ | ~~474.87~~ | ~~162~~ | 786 ~~744~~ | 36 ~~37~~ | 8212.25 | ~~160.10~~ | 554.8 | 173 |
| 3 | Merida Diesel station | | | 2889.5 | | 468.04 | 162 | | | 18 MW | | 6.48 | 360 |
| 4 | | | | | | | | | | | | | |
| 5 | Total II | 1614 | 1809 | ~~2,922.5 MW~~ | | | | 2542 | 36 ~~37~~ | 3230.25 | | 561.28 | 174 |
| 6 | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | |
| 8 | Total plants (I+II) | 47 | 7917.5 | ~~455.92 482.2~~ | | 1290.43 | 163 | 2500 | 58 | 9068.65 | | 1666.56 | 184 |
| 9 | ~~Total plants~~ | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |

FORECASTS | ACTUAL

| | 1 Construction Period | 2 Project Scope | 3 Construction Cost (US$ million) L.C. | 4 F.X. | 5 Total | Cost/KW US$ | 7 | 8 Construction Period | 9 Project Scope | 10 Construction Cost (US$ million) L.C. | 11 F.X. | 12 Total | Cost/KW 13 US$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hydroelectric Plants** | | | | | | | | | | | | | |
| Colombia: ~~Anchicaya~~ ~~ext.~~ | 50 | 44MW | 9.06* | 5.30* | 14.36* | 326.2 | | 81 | 44MW | n.a | n.a | n.a | n.a |
| 1 Calima | 63 | 120MW | 9.80 | 18.90 | 28.70 | 239.2 | 86 ~~+7~~ | | 120MW | 20.54 | 21.65 | 42.19 | 351.6 |
| ~~Laguneta ext~~ | ~~12~~ | ~~18MW~~ | ~~1.41~~ | ~~.99~~ | ~~2.40~~ | ~~133.7~~ | | ~~18~~ | ~~18MW~~ | ~~n.a~~ | ~~1.51~~ | ~~n.a~~ | ~~n.a~~ |
| ~~Salto II ext~~ | ~~30~~ | ~~66MW~~ | ~~5.93~~ | ~~4.51~~ | ~~10.44~~ | ~~158.2~~ | | ~~35~~ | ~~66MW~~ | ~~n.a~~ | ~~6.70~~ | ~~n.a~~ | ~~n.a~~ |
| 2 El Colegio | ~~85~~ X | 300MW | 15.49 | 30.26 | 45.75 | 152.5 | | 85 | 300MW | 19.37 | 34.29 | 53.66 | 178 |
| ~~Cavoad ext~~ | ~~42~~ | ~~50MW~~ | ~~6.43~~ | ~~5.82~~ | ~~12.25~~ | ~~245.0~~ | | ~~42~~ | ~~50MW~~ | ~~n.a~~ | ~~n.a~~ | ~~n.a~~ | ~~n.a~~ |
| 3 Tuxpan | ~~50~~ X | 36MW | 3.58 | 2.63 | 6.21 | 172.5 | | 61 | 36MW | 5.61 | 2.87 | 8.48 | 235.4 |
| 4 Guadalupe III | 63 | 210MW | 7.08 | 15.96 | 23.04 | 109.7 | | 82 | 270MW | 16.58 | 17.60 | 34.18 | 126.6 |
| ~~Guatape ext~~ | ~~48~~ | ~~264MW~~ | ~~26.24~~ | ~~35.96~~ | ~~62.20~~ | ~~235.6~~ | | ~~60~~ | ~~264MW~~ | ~~n.a~~ | ~~n.a~~ | ~~n.a~~ | ~~n.a~~ |
| Mexico: Miguel Aleman System | 78 | 155MW | 13.06 | 6.84 | 19.90 | 128 | → | 104 | 160.8MW | 33.44 | 6.52 | 39.96 | 248 |
| including: Santa Barbara | | | | | | | | 51 | 67.6MW | 5.56 | 2.05 | 7.61 | 112 X |
| San Bartolo I | | | | | | | | 68 | 25.2MW | 4.47 | 1.28 | 5.75 | 228 |
| El Durazno | | | | | | | | 102 | 18MW | 1.89 | 1.28 | 3.17 | 176 |
| Isctapantango | | | | | | | | 33 | 50MW | 0.50 | 1.44 | 1.94 | 117 |
| space → Puebla-Veracruz System | 66 | 35.8MW | 1.02 | 0.97 | 1.99 | 56 | → | | 30.5MW | 3.48 | 1.03 | 4.51 | 148 |
| including: Tepazolco | | | | | | | | 47 | 10.9MW | 1.01 | 0.53 | 1.54 | 141 |
| El Encanto | | | | | | | | 57 | 10MW | 1.26 | 0.44 | 1.70 | 170 |
| Minas I | | | | | | | | 54 | 9.6MW | 1.21 | 0.06 | 1.27 | 132 |
| space → | | | | | | | | | | | | | |
| Bombana | 78 | 2.6MW | 0.43 | 0.10 | 0.53 | 204 | → | 50 | 2.6MW | 1.04 | 0.16 | 1.20 | 377 |
| ~~Alto Lucero~~ | | | | | | | | | | | | | |
| ~~Alvarado (Rio Blanco Victoria)~~ | | | | | | | | | | | | | |
| Tingambato | 45 | 150MW | 9.21 | 7.63 | 16.84 | 112 | | 65 | 135MW | 19.28 | 5.93 | 25.21 | 187 |
| El Cobano | 36 | 55MW | 6.66 | 1.69 | 8.35 | 152 | | 59 | 52MW | 8.04 | 1.74 | 9.78 | 188 |
| Oviachic Parote | | | | | | | | 35 | 19.2MW | 2.00 | 0.74 | 2.74 | 143 |
| Mocuzari | | | | | | | | 37 | 9.6MW | 1.35 | 0.36 | 1.71 | 178 |
| El Fuerte (~~5 units~~) | | | | | | | X * | 52 | 40MW | 4.56 | 1.42 | 5.98 | 150 |
| Temascal | 48 | 154MW | 7.76 | 5.42 | 13.18 | 85 | | 65 | 154MW | 17.07 | 3.41 | 20.48 | 133 |
| Capatitzio | 55 | 73.6MW | 5.77 | 3.53 | 9.30 | 126 | | 65 | 63MW | 18.16 | 4.72 | 22.88 | 363 |
| Mazatepec | 59 | 156MW | 17.95 | 5.41 | 23.36 | 144* | | 74 | 156MW | 45.82 | 11.89 | 57.71 | 319* |
| subtotal | 57 | 3326.0MW | 304.70 | 311.10 | 615.80 | 185 | | 62 | 4060.4MW | 464.88 | 316.63 | 781.51 | 193 |
| | 1089 | | 49.5 | 50.5 | 100.00 | | | 1661 | | | | | |
| Mexico: Mazatepec 4th unit | 4 | 52MW | | | 6.58 | 144* | | 18 | 52MW | | | 8.53 | 319* |
| San Bartolo II | | 20MW | | | 2.90 | 145 | | | 18MW | | | 4.61 | 243 |
| Infiernillo | | 602MW | | | 82.42 | 137 | | | 672MW | | | 111.18 | 165 |
| Santa Rosa | | 60MW | | | 14.67 | 245 | | | 60MW | | | 19.83 | 331 |
| Sanalona | | 14MW | | | 1.96 | 140 | | | 14MW | | | 2.26 | 161 |
| El Novillo | | 90MW | | | 30.41 | 338 | | | 90MW | | | 40.22 | 447 |
| La Venta | | 30MW | | | 10.54 | 351 | | | 30MW | | | 17.76 | 592 |
| Chilapan | | 18MW | | | 1.89 | 105 | | | 18MW | | | 3.91 | 217 |
| El Retiro | | 14MW | | | 4.90 | 348 | | | 21MW | | | 11.60 | 552 |
| El Salto | | 18MW | | | 3.14 | 174 | | | 18MW | | | 5.54 | 308 |
| Malpaso | | 720MW | | | 310.02 | 43 | | | 720MW | | | 80.28 | 115 |

## Forecast

R.E : 29.28
10.00
32.40
71.68

Dist : 37.92
12.00
92.48
Centro [49.52
57.60
IEMSA 20.40

## Actual

Dist. CTE { 108.68 / 1.29 / 113.98
Centro { 26.19 / 40.30
IEMSA 65/66 { 11.06
301.50

Rynd Elect. CTE { 16.85 / 5.55 / 40.42
IIMSA 65/66 11.06
73.86

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | 17.01 | 387 |
| Colombia: ~~Yumbo unit 1&2~~ | | 60 | 22.5MW | 3.41 | 1.42 | 4.83 | 214.6 | 66 | | | | | | | |
| 1 Yumbo unit 3 | ✓ | 24 | 1x33MW | 1.24 | 4.40 | 5.64 | 170.9 | 53 | 20MW | n.a | n.a | 5.66 | 283.0 | | |
| ~~Zipaquira unit 1~~ | ~~✗~~ | ~~18~~ | ~~33MW~~ | ~~4.00~~ | ~~2.83~~ | ~~6.83~~ | ~~207.1~~ | 24 | 1x33MW | 2.77 | 3.70 | 6.47 | 196.1 | | |
| 2 Zipaquira unit 2 | ✓ | 19 | 1x33MW | 1.64 | 7.02 | 8.66 | 231.1 | 32 | 33MW | n.a | 3.22 | ~~n.a~~ | ~~n.a~~ | | |
| | | | | | | | | 31 | 1x37.5MW | 2.68 | 5.60 | 8.08 | 215 | | |
| Mexico: Sonora System including Ciudad Obregon Guaymas I unit 1&2 | | n.a | 40MW | 2.88 | 2.66 | 5.54 | 139 | 21 | 3x5MW | 0.96 | 1.98 | 2.94 | 196 | | |
| | | | | | | | | 42 | 2x12.5MW | 2.61 | 4.41 | 7.02 | 281 | | |
| Guaymas (Potencia) | | n.a | 1x30MW | 1.50 | 2.93 | 4.43 | 148 | 40 | 1x33MW | 2.14 | 2.27 | 4.41 | 134 | | |
| Juarez | | ~~57~~ | 1x5MW | 0.61 | 0.76 | 1.37 | 274 | 24 | 3x5MW | 0.75 | 1.99 | 2.74 | 183 | | |
| Chihuahua | | n.a | 2x25MW | 2.00 | 3.57 | 5.57 | 111 | 40 | 3x15MW | 3.67 | 3.72 | 7.39 | 164 | | |
| Aldama | | n.a | 6MW | 0.35 | 1.07 | 1.42 | 237 | | | | | | | | |
| Motul and la Paz | | 15 | 6.5MW | 1.00 | 1.62 | 2.62 | 403 | | | | | | | | |
| Ciudad Victoria* | | | | | | | | 33 | 2x1MW | 0.37 | 0.26 | 0.63 | 315 | | |
| Merida * | | | | | | | | 28 | 1x6.35MW | 0.61 | 0.67 | 1.28 | 205 | | |
| Villahermosa * | | | | | | | | 23 | 2x2.25MW | 0.73 | 0.43 | 1.16 | 258 | | |
| La Laguna * * | | | | | | | | 24 | 1x33MW | 2.43 | 2.40 | 4.83 | 146 | | |
| Ciudad Victoria (ext) | | | | | | | | 19 | 1x2.5MW | 0.19 | 0.42 | 0.61 | 244 | | |
| Monterrey I | | 22 | 2x15MW | 0.78 | 2.84 | 3.62 | 121 | 29 | 2x15MW | 2.11 | 2.82 | 4.93 | 164 | | |
| Veracruz | | 23 | 1x10MW | 0.46 | 1.37 | 1.83 | 183 | 26 | 1x10MW | 1.50 | 1.43 | 2.93 | 293 | | |

## Forecast.

R.E : 29.28
10.00
32.40
71.68

Dist : 37.92
12.00
92.48
Centro [49.52
57.60
IEMSA 20.40

## Actual

Dist. CTE { 108.68
1.29
113.98

Centro { 26.19
40.30

IEMSA 65/66 { 11.06

301.50

Rural Elect. CTE { 16.85
5.55
40.42

IEMSA 65/66 11.06
73.88

POWER PROJECTS REVIEW
IBRD PROJECTS IMPLEMENTATION

TABLE 1.8

| | | FORECASTS | | | | | | ACTUAL | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Construction Period a/ | Project Scope | Construction Cost (US$ million) L.C. | F.X. | Total | Cost/KW US$ a/ | Construction Period a/ | Project Scope | Construction Cost (US$ million) L.C. | F.X. | Total | Cost/KW US$ a/ |
| **HYDROELECTRIC PLANTS** | | | | | | | | | | | | | |
| BRAZIL: | Furnas | 60 | 1,160 MW | 67.0 | 41.5 | 108.5 | 236 | 85 | 900 MW | 85.42 | 44.84 | 130.26 | 145 |
| | Estreito | 73 | 533 MW | 45.0 | 36.5 | 81.5 | 153 | 59 | 700 MW | 74.1 | 21.8 | 96.2 | 137 |
| ETHIOPIA: | Awash II | 27 | 32 MW | 4.8 | 6.8 | 11.0 | 342 | 31 | 32 MW | 3.37 | 6.93 | 10.30 | 322 |
| | Awash III | 42 | 32 MW | 4.2 | 6.2 | 10.4 | 326 | 79 | 32 MW | 3.655 | 6.94 | 10.549 | 328 |
| GHANA: | Akosombo | 58 | 588 MW | 61.6 | 64.2 | 125.8 | 211 | 55 | 588 MW | 50.33 | 72.26 | 122.59 | 209 |
| MALAYSIA: | Cameron Highlands I | 55 | 79.3 MW | 10.8 | 26.1 | 36.9 | 466 | 52 | 105.5 MW | 14.0 | 19.2 | 33.2 | 315 |
| | Cameron Highlands II | 48 | 154.2 MW | 14.2 | 27.5 | 41.7 | 270 | 41 | 154.2 MW | 17.4 | 30.3 | 47.7 | 309 |
| | SUB-TOTAL I | 52 | 1,878.5 MW | 207.6 | 208.8 | 415.8 | 221 | 57 | 2,511.7 MW | 248.5 | 202.3 | 450.8 | 179 |
| | | | | | | | | | | 248.47 | 202.33 | 450.84 | |
| **THERMAL PLANTS** | | | | | | | | | | | | | |
| ARGENTINA: | Costanera | 60 | 600 5 x 120 MW | 58.00 | 73.05 | 131.05 | 218 | 61 | 600 5 x 120 MW | 65.94 | 71.66 | 137.60 | 229 |
| | Puerto Nuevo Unit 9 | 29 | 250 1 x 250 MW | n.a. | n.a. | 36.85 | 147 | 29 | 250 1 x 250 MW | n.a. | n.a. | 31.20 | 125 |
| | Peaking Units | 20 | 128 8 x 15 MW | n.a. | n.a. | 11.17 | 93 | 13 | 128 8 x 15 MW | n.a. | n.a. | 12.80 | 106 |
| MALAYSIA: | Prai I and II | 92 | 903 3 x 30 MW | 5.70 | 14.45 | 20.15 | 224 | 95 | 903 3 x 30 MW | 5.74 | 12.37 | 18.11 | 201 |
| | Port Dickson I | 35 | 202 2 x 60 MW | 6.8 | 19.0 | 25.8 | 215 | 38 | 202 2 x 60 MW | 7.0 | 13.0 | 20.0 | 167 |
| | Extension of Johore Bahru | n.a. | 202 2 x 30 MW | 2.3 | 7.1 | 9.4 | 157 | 69 | 202 2 x 30 MW | 2.1 | 4.6 | 6.7 | 111 |
| SINGAPORE: | Pasir Panjang I & II | 45 | 240 4 x 60 MW | 9.48 | 25.08 | 34.56 | 144 | 47 | 240 4 x 60 MW | 9.87 | 23.15 | 33.02 | 138 |
| | SUB-TOTAL II | 47 | 1,480 MW | (82.28) | (138.68) | 268.98 | 182 | 50 | 1,480 MW | (90.65) | (124.78) | 259.43 | 175 |
| | TOTAL PLANTS (I & II) | 50 | 3,358.5 | (289.28) | (347.48) | 684.78 | 204 | 54 | 3,991.7 | (339.15) | (327.08) | 710.23 | 178 |
| **TRANSMISSION** | | | | | | | Cost/km US$ '000s | | | | | | Cost/km US$ '000s |
| ARGENTINA: | 132 kv b/ | 45 | 675 km | 38.26 | 25.10 | 63.36 | 93.9 | 45 | 885 km | 74.33 | 17.50 | 91.83 | 103.8 |
| BRAZIL: | 345 kv | n.a. | 1,740 km | 20.75 | 45.80 | 66.55 | 38.2 | not compl. | 1,270 km | 26.44 | 23.17 | 49.61 | 39.1 |
| ETHIOPIA: | 132 kv | n.a. | 323 km | .79 | 3.99 | 4.78 | 14.8 | n.a. | 282 km | 1.21 | 3.99 | 5.20 | 18.4 |
| GHANA: | 165 kv | 38 | 985 km | 9.9 | 28.5 | 38.7 | 35.9 | 44 | 1,045 km | 6.23 | 19.93 | 26.16 | 25.0 |
| MALAYSIA: | 132 kv | 108 | 1,398 km | 11.7 | 22.1 | 33.8 | 24.2 | 108 | 1,422 km | 23.0 | 24.9 | 47.90 | 33.7 |
| | SUB-TOTAL | 60 | 5,121 km | 81.40 | 122.50 | 203.90 | 39.8 | 66 | 4,904 km | 131.21 | 89.49 | 220.70 | 45.0 |
| | | | | | 125.80 | 207.20 | | | | | | | |
| **DISTRIBUTION** | | | | | | | | | | | | | |
| ETHIOPIA | 15 kv or less | n.a. | 990 km | 1.14 | 2.74 | 3.88 | 4.9 | n.a. | 990 km | 0.58 | 1.52 | 2.03 | 2.8 |
| SINGAPORE: | 6.6 kv, 22 kv, 66 kv | 24 | 232 km | 10.0 | 14.3 | 24.3 | 104.7 | 24 | 315 km | 6.06 | 13.08 | 19.14 | 60.8 |
| | SUB-TOTAL | | 1,222 km | 11.42 | 17.73 | 29.15 | 23.8 | | 1,305 km | 6.64 | 15.32 | 21.96 | 16.8 |
| | | | 982 | | | | | | | | | | |
| **RURAL ELECTRIFICATION** | | | | | | | | | | | | | |
| ETHIOPIA: | Diesel Plants and Distribution | n.a. | 5.8 MW | .87 | 1.55 | 2.42 | | n.a. | 9.5 MW | .84 | 1.91 | 2.75 | |
| | TOTAL PROJECTS | | | (382.97) | (489.26) | 920.25 | | | | (477.84) | (433.80) | 955.64 | |
| **PROJECTS NOT COVERED BY IBRD LOANS** | | | | | | | | | | | | | |
| SINGAPORE: | Jurong station (Thermal) 2 | | | | | | | 48 | 4 x 60 MW | 11.9 | 24.1 | 36.0 | 150 |
| BRAZIL: | Funil plant (Hydro) 4 | | | | | | | 96 | 210 MW | - | - | 84.9 | 404 |
| | Santa Cruz plant (Thermal) 3 | | | | | | | 48 | 2 x 80 MW | - | - | 33.4 | 208 |
| ETHIOPIA: | Awash I (Hydro) 5 | | | | | | | n.a. | 43 MW | - | - | 13.8 | 321 |
| | Tis Abbai (Hydro) 6 | | | | | | | n.a. | 9.6 MW | - | - | 6.2 | 646 |
| MALAYSIA: | Malacca plant (Thermal) 1 | | | | | | | 84 | 4 x 10 MW | 2.0 | 6.5 | 8.5 | 212 |

TOTAL LOANS DISBURSEMENT PATTERN

| | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | Undisbursed 12/31/70 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACTUAL: Amount (US$ mln) | | 17.95 | 13.46 | 15.81 | 40.76 | 77.34 | 63.45 | 37.50 | 43.61 | 34.28 | 45.05 | 62.86 | 31.42 | 11.99 |
| % of total | | 3.6 | 2.7 | 3.2 | 8.2 | 15.6 | 12.8 | 7.6 | 8.8 | 6.9 | 9.1 | 12.7 | 6.3 | 2.5 |
| Cumulative % | | 3.6 | 6.3 | 9.5 | 17.7 | 33.3 | 46.1 | 53.7 | 62.5 | 69.4 | 78.5 | 91.2 | 97.5 | |

a/ For sub-totals and totals, average data are given.

b/ Forecast includes only that for Loan 308-AR; actual data aggregate the investments made during Loans 308-525AR.

Guadalupe 230

~~Guadal 230~~

Guadalupe 110

| | 1 | 2 | 3 | 4 | 5 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Transmission | | | | | | | | | | | |
| → argentina (see other paper) | | | | | | | | | | | cost/km |
| Colombia: 115 kV | | n.a. | 4.14 | 5.02 | 9.16 | | n.a. | 5.10 | 9.40 | 14.50 | |
| up to 220 kV | | | | | | | | | | | |
| Mexico: ~~Volt~~ ~~< 220 kV~~ | | 3055 | 12.73 | 35.21 | 47.94 | | 4994 | 35.79 | 30.96 | 56.75 | |
| Sub-Total | | ~~8176~~ | 98.27 | 166.03 | 264.30 | | 9898 | 162.10 | 130.05 | 292.15 | |
| | | 8416 | | | | | | | | | |
| Mexico: ~~Voltage~~ up to < 220 kV | | n.a. | | | n.a. | | 3400 | | | 26.87 | |
| above ~~Voltage~~ > 220 kV | | n.a. | | | n.a. | | 4200 | | | 243.02 | |
| Total Transmission | | | | | | | 17,498 | | | 562.04 | |
| ~~Total~~ | | | | | | | | | | | |
| Distribution | | | | | | | | | | | |
| 2 ~~Ethiopia (see other page)~~ | | | | | | | | | | | |
| 1 4 Colombia 2 first loans | | 1100 km | 3.06 | 4.88 | 7.94 | | 1,065 | 1.78 | 6.35 | 8.13 | |
| 5 Mexico ~~[illegible]~~ 1st ME | | | | | | ~~6~~ | 15,785 connections | 1.78 | 1.18 | 2.96 | |
| Sub-total | X | 2082 km | 14.20 | 21.92 | 36.12 | | | 10.13 | 22.13 | 32.26 | |
| Mexico: 1962-1969 Programs | | | | | 269.92 | | | | | 301.50 | |
| 1 + Argentine | X | 4718 km | | | 311.81 | | 15,641 km | | | 230.59 | |
| Total | | | | | 617.85 | | 16,705 km | | | 564.35 | |
| Rural Electrification | | 6800 km | | | | | + cnn | | | | |
| ↗ Ethiopia (other paper) | | | | | | | | | | | |
| Mexico: ~~IREME~~ first loan | n.a. | 16.9 MW | 7.25 | 3.88 | 11.13 | 65 | 12.6 MW | 1.53 | 2.99 | 4.52 | |
| Sub-total | X | 22.7 MW | 8.12 | 5.43 | 13.55 | | 22.1 | 2.37 | 4.9 | 7.27 | |
| Mexico: 1962-66 and 67-69 programs | | | | | 71.68 | | | | | 73.88 | |
| Total | X | | | | 85.23 | | | | | 81.15 | |
| Space | | | | | | | | | | | |
| Total Projects | | | | | 2257.81 | | | | | 2874.10 | |

# FORECASTS — ACTUAL

| | Forecasts: Construction period | Forecasts: Project scope | Forecasts: Construction cost (US$ million) L.C. | Forecasts: Construction cost (US$ million) F.X. | Forecasts: Construction cost (US$ million) Total | Forecasts: cost/KW US$ | | Actual: Construction period | Actual: Project scope | Actual: construction cost (US$ million) L.C. | Actual: construction cost (US$ million) F.X. | Actual: construction cost (US$ million) Total | Actual: cost/KW US$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hydroelectric Plants** | 19 | | | | | | | 27 | | | | | | |
| Colombia: ~~Anchicaya~~ ~~ext~~ | 50 | 44MW | 8.06 | 6.30 | 14.36 | 326.2 | | 81 | 44MW | n.a | n.a | 22.6 | n.a | |
| 1 Calima | 63 | 120MW | 9.80 | 18.30 | 28.70 ✓ | 239.2 | 147 | 117 | 120MW | 20.54 | 21.65 | 42.19 | 351.6 | |
| ~~Laguneta ext~~ | 12 | 18MW | 1.21 | .98 | 2.19 | 121.7 | | 12 | 18MW | n.a | 1.51 | n.a | n.a | |
| ~~Salto II ext~~ | 30 | 66MW | 5.33 | 4.51 | 10.14 | 152.2 | | 35 | 66MW | n.a | 6.72 | n.a | n.a | |
| 2 El Colegio | 85 X | 300MW | 15.43 | 30.26 | 45.75 ✓ | 152.5 | 117 | 85 | 300MW | 19.37 | 34.29 | 53.66 | 178 | |
| ~~Guavio ext~~ | 42 | 50MW | 6.49 | 5.82 | 12.25 | 245.0 | | 42 | 50MW | n.a | n.a | n.a | n.a | |
| 3 Troneras | 50X | 36MW | 3.58 | 2.63 | 6.21 ✓ | 172.5 | 136 | 61 | 36MW | 5.61 | 2.87 | 8.48 | 235.4 | |
| 4 Guadalupe III | 63 | 210MW | 7.08 | 15.96 | 23.04 ✓ | 109.7 | 115 | 82 | 270MW | 16.58 | 17.60 | 34.18 | 126.6 | |
| ~~Guatapé ext~~ | 48 | 264MW | 26.29 | 35.96 | 62.20 | 235.6 | | 60 | 264MW | n.a | n.a | n.a | n.a | |
| | | | 35.95 | 67.75 | 103.70 | Ave. 64: | 125 | | | 62.10 | 76.41 | 138.51 | | |
| Mexico: Miguel Aleman System | 78 | 155MW | 13.06 | 6.84 | 19.90 ✓ | 128 | 196 → | 104 | 160.8MW | 33.49 | 6.52 | 39.96 | 248 | |
| including: Santa Barbara | | | | | | | | 57 | 67.6MW | 5.56 | 2.05 | 7.61 | 112 | |
| San Bartolo I | | | | | | Average Mex | = 176 | 68 | 25.2MW | 4.47 | 1.28 | 5.75 | 228 | |
| El Durazno | | | | | | | | 102 | 18MW | 1.89 | 1.28 | 3.17 | 176 | |
| Isla Tapantango | | | | | | | | 33 | 50MW | 0.50 | 1.44 | 1.94 | 117 | * |
| space Puebla-Veracruz System | 66 | 35.3MW | 1.02 | 0.97 | 1.99 ✓ | 56 | 264 → | | 30.5MW | 2.48 | 1.03 | 4.51 | 148 | |
| including: Tepazolco | | | | | | | | 47 | 10.9MW | 1.01 | 0.53 | 1.54 | 141 | |
| El Encanto | | | | | | | | 57 | 10MW | 1.26 | 0.44 | 1.70 | 170 | |
| Minas I | | | | | | | | 54 | 9.6MW | 1.21 | 0.06 | 1.27 | 132 | |
| space → | | | | | | | | | | | | | | |
| Bobuboña | 78 | 2.6MW | 0.43 | 0.10 | 0.53 ✓ | 204 | 185 → | 50 | 2.6MW | 1.04 | 0.16 | 1.20 | 317 | |
| Guadalupe ~~Ciliatalpan~~ | | | | | | | | | | | | | | |
| Alto ~~Lerma~~ ~~Victoria~~ | | | | | | | | | | | | | | |
| Tingambato | 45 | 150MW | 9.21 | 7.63 | 16.84 ✓ | 112 | 167 | 65 | 135MW | 19.28 | 5.93 | 25.21 | 187 | |
| El Cobano | 36 | 55MW | 6.66 | 1.69 | 8.35 ✓ | 152 | 124 | 59 | 52MW | 2.04 | 1.74 | 9.78 | 188 | * |
| Oviachic | | | | | | | | 35 | 17.2MW | 2.00 | 0.74 | 2.74 | 142 | * |
| Mocuzari | | | | | | | | 37 | 9.6MW | 1.35 | 0.36 | 1.71 | 178 | * |
| El Fuerte (~~Sinaloa~~) | | | | | | | | 52 | 40MW | 4.56 | 1.42 | 5.98 | 150 | * |
| Temascal | 48 | 154MW | 7.76 | 5.42 | 13.18 ✓ | 85 | 156 | 65 | 154MW | 17.07 | 3.41 | 20.48 | 133 | * |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2) | Capaitzio | 55 | 43.6 | 5.47 | 3.53 | 5.30 | 126 | 288 | 65 | 63 MW | 18.15 | 4.42 | 28.88 | 363 | | |
| | Mazatepec | 59 | 156 MW | 17.95 | 5.41 | 23.36 | 144 * | 221 | 72 | 156 MW | 45.89 | 11.29 | 57.71 | 319 * | | |
| | subtotal | 57 | 3326.2 MW | 3704.70 | 3111.10 | 6815.80 | 185 | | 62 | 4060.4 | 464.88 | 316.63 | 781.51 | 193 | | |
| | | 1089 | | | | | | | 1661 Mexico | | 154.31 | 37.89 | 192.16 | | | |
| Mexico | Mazatepec 4th unit | 4 | 52 MW | | | 6.58 | 144 * | 221 | 18 | 52 MW | 8.03 | 10.7 | 8.53 | 319 * | | |
| | San Bartolo II | | 20 MW | | | 2.90 | 145 | 167 | | 18 MW | | | 4.61 | 243 | | |
| | Infiernillo | | 602 MW | | | 82.42 | 137 | 120 | | 672 MW | | | 111.18 | 165 | | |
| | Santa Rosa | | 60 MW | | | 14.67 | 245 | 135 | | 60 MW | | | 12.83 | 221 | | |
| | Sanalona | | 14 MW | | | 1.26 | 140 | 115 | | 14 MW | | | 2.26 | 161 | | |
| | El Novillo | | 90 MW | | | 30.41 | 338 | 132 | | 90 MW | | | 40.22 | 447 * | | |
| | La Venta | | 30 MW | | | 10.54 | 351 | 169 | | 30 MW | | | 17.76 | 592 | | |
| | Chilapan | | 18 MW | | | 1.88 | 105 | 207 | | 18 MW | | | 3.91 | 217 * | | |
| | El Retiro | | 14 MW | | | 4.20 | 342 | 159 | | 21 MW | | | 11.60 | 552 | | |
| | El Salto | | 18 MW | | | 3.14 | 174 | 177 | | 18 MW | | | 5.54 | 308 | | |
| | Malpaso | | 720 MW | | | 31.02 | 43 | 267 | | 720 MW | | | 80.22 | 115 * | | |
| XX | El Fuerte 3rd unit | | 20 MW | | | 1.02 | 51 | 108 | | 20 MW | | | 1.10 | 55 * | | |
| | Total I | 54 | 5028 MW | 3577.77 | 263.52 | 822.39 | 164 | | 61 | 5838.4 | | 323.52 | 1105.28 | 189 | | |
| X | Aplicaciya | 50 | 44 MW | | | 15.14 | 344 | 112 | 77 | 44 MW | | | 17.01 | 387 | | |
| | Nacional Plants | | | | | | | | (1756) | | | | | | | |
| | | 1163 | | | | | | | | | | | | | | |
| Colombia: | Yumbo unit 1 | 6 | 22.5 MW | 3.41 | 1.42 | 4.83 | 214.5 | | 53 | 2 MW | n.a | n.a | 5.66 | 883.0 | | |
| | 1 Yumbo unit 3 | 24 | 1x33 MW | 1.24 | 4.40 | 5.64 | 170.9 | 115 | 24 | 1x33 MW | 2.77 | 3.70 | 6.47 | 176.1 | | |
| | Zipaquira unit 1 | 18 | 33 MW | 4.00 | 2.82 | 6.83 | 207.1 | | 32 | 33 MW | n.a | 3.22 | n.a | n.a | | |
| | 2 Zipaquira unit 2 | 19 | 1x33 MW | 1.64 | 7.02 | 8.66 | 231.1 | 93 | 31 | 1x37.5 MW | 2.48 | 5.60 | 8.08 | 216 | | |
| | | | 2x33 MW | 2.88 | 11.42 | 14.30 | 217 | Aver. Colombia = 113 | | 70.5 MW | 5.25 | 9.30 | 14.55 | 206 | | |
| Mexico: | Sonora System | n.a | 40 MW | 2.88 | 2.66 | 5.54 | 139 | 178 | | 40 MW | BE | CH | 9.96 | 249 | | |
| | Ciudad Obregon | | | | | | | | 21 | 3x5 MW | 2.36 | 1.98 | 2.34 | 196 | | |
| | Guaymas I unit 1-2 | | | | | | | | 42 | 2x12.5 MW | 2.61 | 4.41 | 7.02 | 231 * | | |
| | Guaymas (Rotguian) | n.a | 1x30 MW | 1.50 | 2.93 | 4.43 | 148 | 91 | 40 | 1x33 MW | 2.14 | 2.27 | 4.41 | 134 ? | | |
| | Juarez | 57 | 1x5 MW | 0.61 | 0.76 | 1.37 | 274 | 67 | 24 | 3x5 MW | 0.75 | 1.99 | 2.74 | 183 | | |
| | Chihuahua | n.a | 2x25 MW | 2.00 | 3.57 | 5.57 | 111 | 148 | 40 | 3x15 MW | 3.67 | 3.72 | 7.39 | 164 | | |
| | Aldama | n.a | 6 MW | 0.35 | 1.07 | 1.42 | 237 | | | | | | | | | |
| | Motul and la Paz | 15 | 6.5 MW | 1.00 | 1.62 | 2.62 | 203 | | | | | | | | | |
| | Ciudad Victoria* | | | | | | | | 33 | 2x1 MW | 0.37 | 0.26 | 0.63 | 315 | | |
| | Merida * | | | | | | | | 28 | 1x6.35 MW | 0.61 | 0.67 | 1.28 | 205 | | |

3)

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Villahermosa * | | | | | | | | Average Mexico: 137 | | 23 | 2×2.25MW | 0.73 | 0.43 | 1.16 | 258 | |
| | La Laguna * | | | | | | | | | | 24 | 1×33MW | 2.23 | 2.40 | 4.83 | 144 | * |
| | Ciudad Victoria (ext) * | | | | | | | | | | 19 | 1×2.5MW | 0.19 | 0.42 | 0.61 | 244 | * |
| | Monterrey I | 22 | 2×15MW | 0.78 | 2.84 | 3.62 | 121 | 136 | | | 29 | 2×15MW | 2.11 | 2.82 | 4.93 | 164 | |
| | Veracruz | 23 | 1×10MW | 0.46 | 1.37 | 1.83 | 183 | 160 | | | 26 | 1×10MW | 1.50 | 1.43 | 2.93 | 293 | |
| | Sub total | 39 | 1,3 53.5MW | 94.74 | 166.92 | 261.66 | 193 | 132 | | | 38 | 1401.75MW | 113.97 | 156.88 | 270.85 | 193 | |
| Chihuahua | Yumbo 1 and 2 | 30 | 1×12+1×10 | | | 4.33 | 215 | | | | 30 | 2×10MW | — | — | 5.66 | 283 | |
| Mexico | Valle de Mexico | | 1×150MW | | | 13.62 | 91 | 131 | | | | 1×150MW | | | 17.91 | 119 | |
| | Poza Rica | | 3×39MW | | | 15.07 | 129 | 147 | | | | 3×39MW | | | 22.17 | 189 | |
| | Delicias | | 3×33MW | | | 13.51 | 136 | 140 | | | | 3×33MW | | | 18.78 | 190 | |
| | Monterrey II | | 3×75MW | | | 27.13 | 121 | 115 | | | | 3×75MW | | | 31.18 | 139 | |
| | Rio Bravo | | 2×37.5MW | | | 9.20 | 123 | 116 | | | | 2×37.5MW | | | 10.72 | 143 | |
| | Nava | | 1×37.5MW | | | 7.0 | 187 | 190 | | | | 1×37.5MW | | | 13.34 | 356 | |
| | Tijuana unit 1,2,3 | | 3×75MW | | | 28.65 | 127 | 129 | | | | 3×75MW | | | 36.82 | 164 | * |
| | Tijuana unit 4 | | 1×82MW | | | 10.4 | 127 | 102 | | | | 1×82MW | | | 10.57 | 129 | * |
| | Jalisco | | 2×6.25MW | | | 3.79 | 303 | 110 | | | | 2×6.25MW | | | 4.16 | 333 | |
| | Merida unit 1&2 | | 2×6.25MW | | | 3.02 | 242 | 132 | | | | 2×6.25MW | | | 4.00 | 320 | * |
| | Popolocampo | | | | | 6.52 | 163 | 157 | | | | 1×41MW | | | 10.51 | 256 | |
| | La Laguna unit 4 | | 1×40MW | | | 5.76 | 144 | 147 | | | | 1×41.0MW | | | 8.57 | 211 | * |
| | Salamanca I | | | | | | | | | | | 1×14MW | | | 1.48 | 106 | |
| | Salamanca II | | | | | | | | | | | 1×150MW | | | 18.10 | 121 | |
| | Guanuel unit 4 | | 1×40MW | | | 6.52 | 163 | 197 | | | | 1×41MW | | | 13.15 | 321 | * |
| Gas Turbine | Poliritos | | 2×14MW | | | 3.34 | 119 | 138 | | | | 2×14MW | | | 4.59 | 164 | |
| | Tampico | | | | | | | | | | | 1×14MW | | | 2.07 | 148 | |
| | Guadalajara (extension) | | | | | | | | | | | 2×14MW | | | 2.85 | 102 | * |
| | Merida unit 4 | | | | | | | | | | | 1×14MW | | | 1.65 | 118 | * |
| | Acapulco | | | | | | | | | | | 1×14MW | 44.2 | 55.8 | 1.57 | 112 | * |
| | | Mexico: 177.50 | | | | 26.40 | 149 | | | | Mexico: 221.25MW | | 18.07 | 22.80 | 40.87 | 185 | |
| | ~~Total~~ | | 1321.50 | | | 179.93 | 136 | | | | | 1641.75MW | | | 275.16 | 168 | |
| | Total 422 | 38 | 2889.5 | ~~20.15~~ | ~~171.17~~ | 474.87 | ~~116.2~~ | | 144 | 37 | | 3212.25 | | 160.10 | 554.8 | 173 | |
| | Merida Diesel station | | | | | 468.04 | 162 | | | | | 187MW | | | 6.48 | 360 | |
| | Total II | 184 | 2889.5 MW | — | — | — | — | | | 37 | | — | | | 561.28 | 174 | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total plants I (I+II) | 47 | 7917.5 | | | 1290.43 | 163 | | 2500 | 58 | 9068.65 | | | | 1666.56 | 184 |
| 4 | | | | | | | | | | | | | | | |
| Transmission | | | | | | | | | | | | | | | Lost Calc |
| Colombia - 115 kv | 54 | | 4.14 | 5.02 | 3.16 | | | | 84 | | 5.10 | 9.40 | 14.50 | | |
| Mexico: Voltage ≤ 220 kV | | 3055 | 12.73 | 35.21 | 47.94 | 15.6 | | | | 4994 | 35.79 | 30.96 | 56.75 | | 11.4 |
| Sub-Total | | 8416 | 98.27 | 166.03 | 264.30 | | | | | 9898 | 162.10 | 130.05 | 292.15 | | |
| | | | | | | | | | | | 55.5 | 44.5 | | | |
| Mexico: Voltage ≤ 220 kV | | n.a. | | | n.a. | | | | | 3400 | | | 26.87 | | 7.9 |
| Voltage > 220 kV | | n.a. | | | n.a. | | | | | 4200 | | | 243.02 | | 57.9 |
| Total Transmission | | | | | | | | | | 17,498 | | | 562.04 | | |
| Distribution | | | | | | | | | | | | | | | |
| Colombia | na | 1100 km | 3.06 | 4.88 | 7.94 | 7.2 | | | na | 1,065 | 1.78 | 6.35 | 8.13 | | 7.6 |
| Mexico 12.5 kV - ME | na | | | | | | | | 41 | 15,785 amortiz | 1.78 | 1.18 | 2.96 | | |
| Sub-total | X | 2082 km | 14.20 | 21.92 | 36.12 | | | | | | 10.13 | 22.13 | 32.26 | | |
| Mexico - 1962-1969 Program | | | | | 269.92 | | | | | | 31.4 | 68.6 | 301.50 | | |
| + Argentine | | 4718 km | | | 311.81 | 23.1 | | | | 15,641 km | | | 230.59 | | 14.7 |
| Total | X | | | | 617.85 | | | | | 16,705 km | | | 564.35 | | |
| Rural electrification | | 6800 km | | | | | | | | + cnn | | | | | |
| Mexico: 12 kV | n.a. | 15.9 mi | 7.25 | 3.88 | 11.13 | | | | 65 | 12.6 mi | 1.53 | 2.99 | 4.52 | | |
| | | 22.7 mi | 8.12 | 5.43 | 13.55 | | | | | 22.1 | 2.27 | 4.9 | 7.27 | | |
| Sub-total | X | | | | 91.68 | | | | | | | | 73.88 | | |
| Mexico - 1961-64 and 67-69 | | | | | 85.23 | | | | | | | | 81.15 | | |
| Total | | | | | | | | | | | | | | | |

Lower Project Reviews - Selected Indicators on subsidies

| | Unit | 1969 | 1975 | 1980 |
|---|---|---|---|---|
| **Operations** | | | | |
| 1 Installed Capacity (year-end) | | | | |
| Hydro | MW | | | |
| Thermal | MW | 600 | 1,200 | 1,800 |
| Diesel | MW | | | |
| Total | MW | 600 | 1,200 | 1,800 |
| 2 Peak Demand | MW | 516 | 840 | 1,400 |
| 3 Base Electricity Tariff | Rp/kWh | 3.0 | 3.0 | 3.0 |
| 4 Average Tariff | Rp/kWh | 3.0 | 3.0 | 3.0 |
| 5 Total Sales | GWh | 2,000 | 4,000 | 8,000 |
| 6 Losses as % of Gen. | % | 20 | 20 | 20 |
| 7 Generation | GWh | 2,500 | 5,000 | 10,000 |
| 8 Thermal Generation | GWh | 2,500 | 5,000 | 10,000 |
| **Finances** | | | | |
| 1 Future Revenue Requirements | Rp.b | 1,200 | 2,400 | 4,800 |
| 2 Future Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 3 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 4 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 5 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 6 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 7 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 8 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| **Miscellaneous Indicators** | | | | |
| 1 Debt/Equity Ratio | % | 60 | 60 | 60 |
| 2 Interest Rate | % | 10 | 10 | 10 |
| 3 Debt-Equity Ratio | % | 60 | 60 | 60 |
| 4 Debt Service Ratio | % | 1.5 | 1.5 | 1.5 |
| 5 Debt Service | Rp.b | 100 | 200 | 400 |
| 6 Total Debt | Rp.b | 1,000 | 2,000 | 4,000 |
| 7 Total Debt | Rp.b | 1,000 | 2,000 | 4,000 |
| 8 Total Debt | Rp.b | 1,000 | 2,000 | 4,000 |

| | Unit | 1969 | 1975 | 1980 |
|---|---|---|---|---|
| **Operations** | | | | |
| 1 Installed Capacity (year-end) | | | | |
| Hydro | MW | 500 | 1,000 | 1,500 |
| Thermal | MW | 100 | 200 | 300 |
| Diesel | MW | | | |
| Total | MW | 600 | 1,200 | 1,800 |
| 2 Peak Demand | MW | 516 | 840 | 1,400 |
| 3 Base Electricity Tariff | Rp/kWh | 3.0 | 3.0 | 3.0 |
| 4 Average Tariff | Rp/kWh | 3.0 | 3.0 | 3.0 |
| 5 Total Sales | GWh | 2,000 | 4,000 | 8,000 |
| 6 Losses as % of Gen. | % | 20 | 20 | 20 |
| 7 Generation | GWh | 2,500 | 5,000 | 10,000 |
| 8 Thermal Generation | GWh | 2,500 | 5,000 | 10,000 |
| **Finances** | | | | |
| 1 Future Revenue Requirements | Rp.b | 1,200 | 2,400 | 4,800 |
| 2 Future Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 3 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 4 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 5 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 6 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 7 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 8 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| **Miscellaneous Indicators** | | | | |
| 1 Debt/Equity Ratio | % | 60 | 60 | 60 |
| 2 Interest Rate | % | 10 | 10 | 10 |
| 3 Debt-Equity Ratio | % | 60 | 60 | 60 |
| 4 Debt Service Ratio | % | 1.5 | 1.5 | 1.5 |
| 5 Debt Service | Rp.b | 100 | 200 | 400 |
| 6 Total Debt | Rp.b | 1,000 | 2,000 | 4,000 |
| 7 Total Debt | Rp.b | 1,000 | 2,000 | 4,000 |
| 8 Total Debt | Rp.b | 1,000 | 2,000 | 4,000 |

| | Unit | 1969 | 1975 | 1980 |
|---|---|---|---|---|
| **Operations** | | | | |
| 1 Installed Capacity (year-end) | | | | |
| Hydro | MW | 500 | 1,000 | 1,500 |
| Thermal | MW | 100 | 200 | 300 |
| Diesel | MW | | | |
| Total | MW | 600 | 1,200 | 1,800 |
| 2 Peak Demand | MW | 516 | 840 | 1,400 |
| 3 Base Electricity Tariff | Rp/kWh | 3.0 | 3.0 | 3.0 |
| 4 Average Tariff | Rp/kWh | 3.0 | 3.0 | 3.0 |
| 5 Total Sales | GWh | 2,000 | 4,000 | 8,000 |
| 6 Losses as % of Gen. | % | 20 | 20 | 20 |
| 7 Generation | GWh | 2,500 | 5,000 | 10,000 |
| 8 Thermal Generation | GWh | 2,500 | 5,000 | 10,000 |
| **Finances** | | | | |
| 1 Future Revenue Requirements | Rp.b | 1,200 | 2,400 | 4,800 |
| 2 Future Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 3 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 4 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 5 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 6 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 7 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 8 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| **Miscellaneous Indicators** | | | | |
| 1 Debt/Equity Ratio | % | 60 | 60 | 60 |
| 2 Interest Rate | % | 10 | 10 | 10 |
| 3 Debt-Equity Ratio | % | 60 | 60 | 60 |
| 4 Debt Service Ratio | % | 1.5 | 1.5 | 1.5 |
| 5 Debt Service | Rp.b | 100 | 200 | 400 |
| 6 Total Debt | Rp.b | 1,000 | 2,000 | 4,000 |
| 7 Total Debt | Rp.b | 1,000 | 2,000 | 4,000 |
| 8 Total Debt | Rp.b | 1,000 | 2,000 | 4,000 |

| | Unit | 1969 | 1975 | 1980 |
|---|---|---|---|---|
| **Operations** | | | | |
| 1 Installed Capacity (year-end) | | | | |
| Hydro | MW | 500 | 1,000 | 1,500 |
| Thermal | MW | 100 | 200 | 300 |
| Diesel | MW | | | |
| Total | MW | 600 | 1,200 | 1,800 |
| 2 Peak Demand | MW | 516 | 840 | 1,400 |
| 3 Base Electricity Tariff | Rp/kWh | 3.0 | 3.0 | 3.0 |
| 4 Average Tariff | Rp/kWh | 3.0 | 3.0 | 3.0 |
| 5 Total Sales | GWh | 2,000 | 4,000 | 8,000 |
| 6 Losses as % of Gen. | % | 20 | 20 | 20 |
| 7 Generation | GWh | 2,500 | 5,000 | 10,000 |
| 8 Thermal Generation | GWh | 2,500 | 5,000 | 10,000 |
| **Finances** | | | | |
| 1 Future Revenue Requirements | Rp.b | 1,200 | 2,400 | 4,800 |
| 2 Future Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 3 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 4 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 5 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 6 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 7 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| 8 Net Revenues | Rp.b | 1,000 | 2,000 | 4,000 |
| **Miscellaneous Indicators** | | | | |
| 1 Debt/Equity Ratio | % | 60 | 60 | 60 |
| 2 Interest Rate | % | 10 | 10 | 10 |
| 3 Debt-Equity Ratio | % | 60 | 60 | 60 |
| 4 Debt Service Ratio | % | 1.5 | 1.5 | 1.5 |
| 5 Debt Service | Rp.b | 100 | 200 | 400 |
| 6 Total Debt | Rp.b | 1,000 | 2,000 | 4,000 |
| 7 Total Debt | Rp.b | 1,000 | 2,000 | 4,000 |
| 8 Total Debt | Rp.b | 1,000 | 2,000 | 4,000 |

# Number of plants:

| | H | T | Total |
|---|---|---|---|
| CTE: | 24 | 24 | 48 |
| Columbia | 8 | 2 | 10 |
| EELPA | 2 | — | 2 |
| VRA | 1 | — | 1 |
| Furnas | 2 | — | 2 |
| SEGBA | — | 2 | 2 |
| NEB | 2 | 3 | 5 |
| PUS | — | 1 | 1 |
| Total | 39 | 32 | 71 |

Guadalupe III: rock conditions in [illegible] plant.

Tronerias:

Guadalupe III:

# Colombia

| | F. | A | Plant |
|---|---|---|---|
| EPM = Troneras | 36 MW H | 36 MW H | 1 |
| Guadalupe III | 270 MW H | 270 MW H | 1 |
| Guatape | 132 MW H | 132 MW H | 1 |
| CVC/CHIDRAL: | 44 MW H | 44 MW H | 1 |
| Anchicaya | 120 MW H | 120 MW H | 1 |
| Calima | 1x12.5+1x10+1x33 T | 2x10+1x33 T | 1 |
| Yumbo | | | |
| EEEB = Laguneta | 18 MW H | 18 MW H | 1 |
| Salto II | 66 MW H | 66 MW H | 1 |
| El Colegio | 300 MW H | 300 MW H | 1 |
| Zipaquira | 2x33 MW T | 1x37.5+1x33 T | 1 |
| Total | | | 10 |
| o.w. | | H | 8 |
| | | T | 2 |